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# POTENTIAL EFFECTS OF WINTER NAVIGATION ON MOVEMENTS OF LARGE LAND MAMMALS IN EASTERN LAKE SUPERIOR AND ST. MARY'S RIVER AREA

## Great Lakes-St. Lawrence Seaway Navigation Season Extension Program





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This is a report on field investigations conducted during the winter of 1979-80. The investigations were to determine: the species and relative numbers of mammals that use the ice of St. Marys River and Whitefish Bay for travel; the locations most commonly used for travel; the purpose of using the ice, i.e., migrating, or foraging; whether animals would swim across open water in winter; and to assess potential effects of winter shipping on the movement of mammals on ice. A preliminary assessment of the impact of winter shipping on mammal movements was completed. It considered effects on deer, seasonal migrations, daily movements and direct mortality; the dispersal of wolves, bobcats, lynx, moose, coyotes and red foxes.

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# POTENTIAL EFFECTS OF WINTER NAVIGATION ON MOVEMENTS OF LARGE LAND MAMMALS IN THE EASTERN LAKE SUPERIOR AND ST. MARY'S RIVER AREA

by

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# PREFACE

This is a final report on Task 2 of Contract Number 14-16-0009-79-053 between Northern Michigan University and the Department of Interior, U.S. Fish and Wildlife Service. Task 1 involved a literature and information search pertaining to movements and dispersal of wolves, coyotes, foxes, bobcats, lynx, deer, and moose, and local records of the occurrence and distribution of these species in the St. Mary's River-Whitefish Bay area. The report on Task 1 was submitted in December 1979.

Task 2 consisted of field investigations during the winter of 1980 to determine (1) the species and relative numbers of mammals that use the ice of the St. Mary's River and Whitefish Bay for travel, (2) the locations most commonly used for travel, (3) the purpose of using the ice such as migration, traveling directly across the ice, traveling along the ice, or foraging on the river or bay, (4) whether animals would swim across open water in winter, and (5) to assess potential effects of winter shipping on the movements of mammals on the ice. Observations were made by aerial and ground surveys of tracks and animals from January-March, 1980. The period was characterized by mild to average weather conditions and no commercial shipping between 15 January and 24 March.

## EXECUTIVE SUMMARY

A study was conducted during the winter of 1979-80 concerning the movements of seven species of large land mammals (red fox, wolf, coyote, bobcat, lynx, white-tailed deer, and moose) across the ice of Whitefish Bay in eastern Lake Superior and the St. Mary's River. The objective was to obtain basic information on species, frequency, time and location of crossings and to estimate the potential impact of winter shipping on mammal movements. Methods involved aerial and ground surveys of tracks and direct observations of some animals.

During the 15 January-22 March period, 554 sets of tracks were observed crossing the channels of the St. Mary's River; 281 (51%) were of white-tailed deer, 84 (15%) of coyotes, 34 (6%) of red foxes, 25 (5%) of domestic dogs, 39 (7%) of unidentified canids, and 85 (15%) of unidentified large mammals. Only one bobcat track and no lynx, wolf or moose tracks were located. Adjusting for days on which weather conditions were not suitable for recording tracks, we estimated a total of 1,743 animals crossing the river channels, of which 1,144 crossed shipping channels and 599 crossed non-shipping channels.

Coyotes and foxes were most active in January and early February; deer were most active in January, early February, and late March. Coyotes, foxes and especially deer, crossed narrow channels significantly more often than wide channels. Coyotes and foxes tended to cross channels indirectly or meander on the ice while deer crossed on a direct route. Ninety percent of crossings recorded on the river were on channels adjacent to Neebish Island. On two channels, Middle Neebish and East Neebish near Stribling Point, the directional pattern and timing of movements indicated deer migration toward Neebish Island in late January and early February. At Mirre Point and Johnson Point on southern Neebish Island, deer movements across the channel were frequent throughout the winter and in both directions, indicating use of resources on both sides on a regular basis; a large winter deer yard is present on southern Neebish Island.

After passages of a small U.S. Coast Guard icebreaker, 27 coyotes and 4 foxes were found to have little trouble in crossing the partially frozen or freshly refrozen ship track, while 37 deer were all obstructed from crossing within 24 hours and 2 of 4 were prevented from crossing 36 hours after ship passage.

Frequent high winds, snow, and variable ice conditions on Whitefish Bay combined to make quantitative tracks surveys there difficult. Near islands in Whitefish Bay tracks of foxes, deer and wolf were identified. The partially obliterated tracks of a pack of five wolves were observed near South Sandy Island, 6.6 km from the Ontario mainland and 17 km from where the ship track would be near Whitefish Point.

A preliminary assessment of the impact of winter shipping on mammal movements suggests that the effects are adverse on deer, impeding seasonal migration, and daily movements and causing some direct mortality; they are incompletely

known but probably hinder the dispersal of wolves, bobcats, lynx, and moose, and they are likely slight on coyotes and red foxes. Mitigating measures suggested include cessation of winter shipping, grouping ships to permit refreezing of the ship track, conducting shipping only between 10 February and 10 March, shipping only in West Neebish Channel, habitat manipulation to redirect deer movements, and simulating dispersal by transporting members of rare species across the channel. Because of the possibly lingering impact of winter demonstration shipping between 1971 and 1979, it is recommended that shipping be discontinued for at least three consecutive winters to permit the system to readjust and so that baseline data gathered on mammal movements on the ice may be more representative of non-shipping conditions. Further information is specifically needed on deer movements and behavior at Neebish Island to determine the number of individual deer crossing the channel, and on wolf densities and behavior along the Ontario shoreline of Whitefish Bay.

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## PART I: INTRODUCTION

The opportunity for mammals to cross water barriers is important in influencing (1) the distribution of species by permitting range expansion through colonization of favorable habitat, (2) the nourishment of small populations by immigration, and (3) access to seasonal resources such as winter food or shelter. For mammals which are active in winter, walking on ice is probably the most important method of dispersal across water barriers.

Winter ship movements and icebreaking activities result in a vessel track containing open water and floating and flowing ice chunks. Often ridges or piles of ice form along its edges. These masses may refreeze, depending on air and water temperature. The potential effects of this environmental disturbance to the movement of large land mammals include both the hindrance of movements from one side of a body of water to the other and the direct mortality of individuals which fall through thin or otherwise unsafe ice and are then unable to return to shore.

Apparently, no quantitative studies concerning movements of large land mammals across ice have been reported. Travel across ice has been implied in numerous studies of island colonization (Jackson 1919, Hatt et al. 1948, Banfield 1954, Werner 1956, Ozoga and Phillips 1964, Long 1978), but most reports of actual ice crossings have been anecdotal (Jackson 1919, Bergman 1966, Peterson 1979, Van Druff and Lomolino 1979).

Many studies have been conducted concerning the effects of extensive linear environmental disturbance on movements of large land mammals, specifically regarding highways (Bellis and Graves 1971, Puglisi et al. 1974, Reilly and Green 1974, Singer 1978), railways (Klein 1971), and oil pipelines (Klein 1979a). Villmo (1975) also noted the effect of fluctuating water levels on ice cover associated with hydroelectric projects in Scandinavia and the obstruction of reindeer (Rangifer tarandus) migration routes. Few studies have addressed the effects of winter navigation and mammal movements. Miller and Gunn (1978) briefly referred to the potential conflict between winter shipping and inter-island movements of caribou in the Northwest Territories. V. A. Kuzyakin (cited viva voce in Klein 1979b) stated that the use of icebreakers in a portion of the Soviet Union may pose an obstacle to reindeer migration. Wright (1978) and Van Druff and Lomolino (1979) recently conducted baseline surveys of winter mammal distribution on the St. Lawrence River winter navigation demonstration area. Only Bergman (1968) observed some incidental effects of winter shipping on one species, the red fox (Vulpes vulpes), in Finland.

We conducted field studies from 5 January through 18 April 1980 to document the numbers, locations, and times of movements of wolves (Canis lupus), coyotes (C. latrans), red foxes (Vulpes fulva), lynx (Lynx canadensis), bobcats (_L. rufus_), moose (_Alces alces_) and white-tailed deer (_Odocoileus virginianus_) across Whitefish Bay and the St. Mary's River in the eastern Lake Superior area, and to assess the potential impact of winter navigation in this area. This paper describes those investigations.

## PART II: STUDY AREA

### Physical Geography

Whitefish Bay, the easternmost part of Lake Superior, covers approximately 1,650 $km^2$; Whitefish Point, Michigan is 26 km from the nearest Ontario mainland and 17 km from the nearest large island (Ile Parisienne, 10 $km^2$) in between. The St. Mary's River flows southeasterly, connecting Whitefish Bay with Lake Huron, and separates the state of Michigan in the United States, from the province of Ontario in Canada (Figure 1). The portion of the river through which ships travel is approximately 101 km long and varies in width from 0.2-7.0 km (mean = 2.8 km). Four large islands in the river (Neebish, Sugar, Drummond, and St. Joseph) cover from 50-380 $km^2$; over 100 smaller islands (< 4 $km^2$) are also present. In its course, the St. Mary's River widens into three large "lakes": Lake George, east of Sugar Island; Lake Nicolet, west of Sugar Island; and Munuscong Lake, south of Neebish Island.

Topography on the Michigan mainland along the St. Mary's River is relatively flat, rising at most only 45 m above the Lake Superior shoreline which is 183 m above sea level. A high point on Sugar Island is 267 m ASL. The relatively flat band of land 1-10 km wide adjoining the St. Mary's River on the Ontario side gives way abruptly to hills in the north rising up to 420 m ASL.

Sault Ste. Marie, Ontario (population 85,000) and Sault Ste. Marie, Michigan (population 15,000) are the largest urban cetners in the area and are located directly across from one another on the northwestern portion of the river (Figure 1). Dense urban settlement extends about 10 km along both sides. Many of the flat areas on both sides of the river, including St. Joseph Island, have been extensively cleared for agriculture, and the majority of the rural population resides in these areas. Numerous roads transect the flat areas, but only two major roads are present in the hills to the north, and that area is relatively uninhabited.

### Vegetation

In the non-agricultural areas, various stages of secondary vegetational succession lead either to temperate deciduous forest of boreal coniferous forest (Curtis 1959, Maycock and Curtis 1960). We divided vegetation within 50 m of shore on part of the river (Middle Neebish and Munuscong Channels) into five categories. These classifications, with corresponding plant associations described by Curtis (1959) shown in parentheses, are as follows: (1) Marsh (emergent aquatic) - Alder/willow swamp (alder thicket) - major species include bulrushes (*Scirpus* spp.) and cat-tails (*Typha latifolia*) often found in close proximity to alder (*Alnus* spp.), willow (*Salix* spp.) and red-osier dogwood (*Cornus stolonifera*); (2) Cedar (northern wet-mesic swamp) - upland conifer (northern xeric forest) - relatively pure stands of white cedar (*Thuja occidentalis*) at the shoreline, extending inland mixed with balsam fir (*Abies balsamea*), hemlock (*Tsuga canadensis*), white spruce (*Picea glauca*), white pine (*Pinus strobus*), red pine (*P. resinosa*), and jackpine

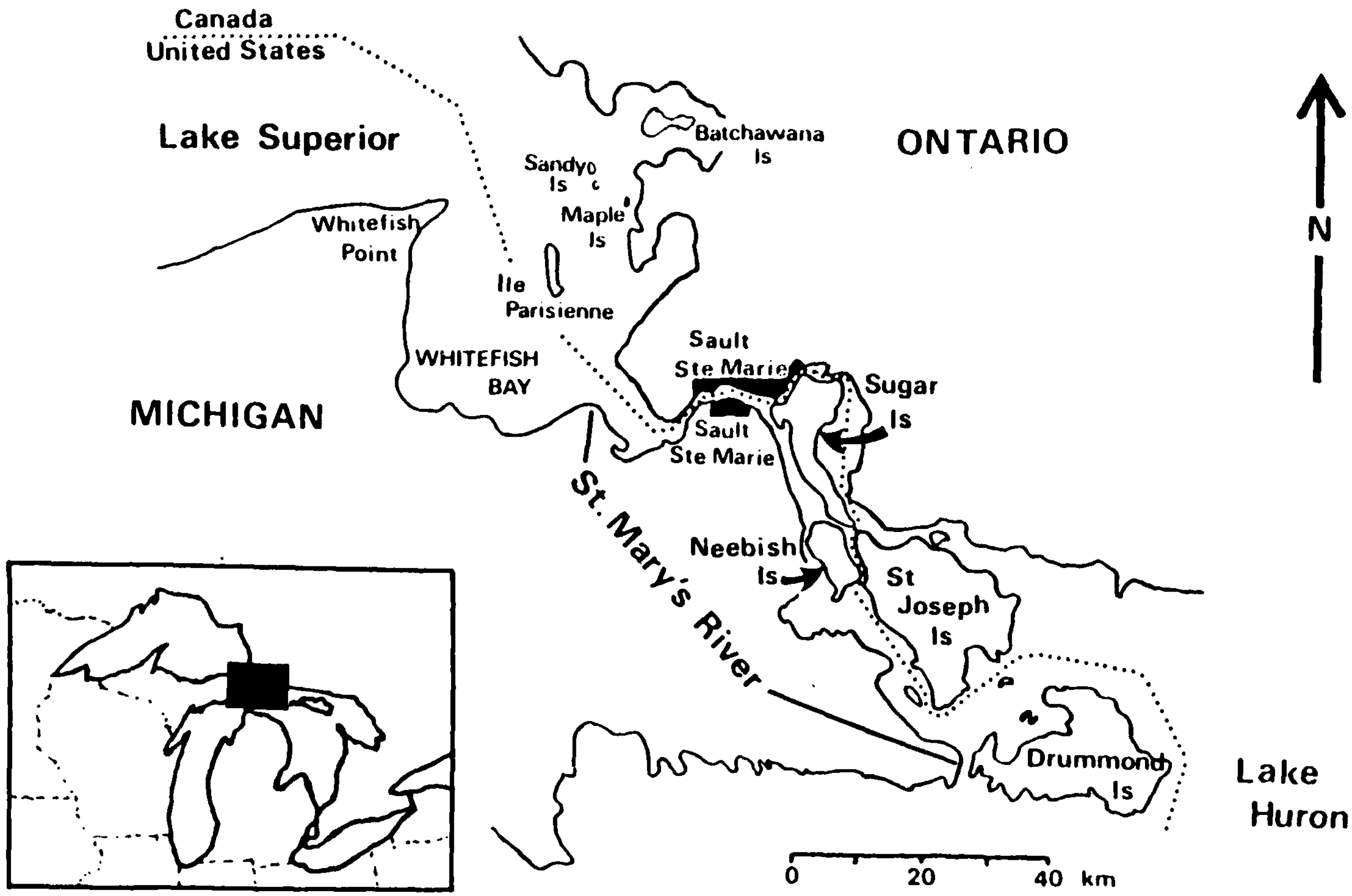


Figure 1. Map of the Whitefish Bay - St. Mary's River Study Area.

(P. banksiana); (3) Upland deciduous (northern mesic forest ) - lowland deciduous (wet-mesic forest) - sugar maple (Acer saccharum) is dominant, with red maple (A. rubrum), beech (Fagus grandifolia), yellow birch (Betula alleghaniensis), basswood (Tilia americana), American elm (Ulmus americana) and black ash (Fraxinus nigra) present. Aspen (Populus spp.), white birch (Betula papyrifera), red oak (Quercus rubra), hemlock and willow are also present; (4) Mixed deciduous-conifer - in general, mixed stands including at least 25 percent of a deciduous or coniferous tree species. Common associations include hemlock, balsam fir and maple, or white spruce, aspen and white birch; (5) Field-brush (weed communities) - these are areas characterized by invading species such as yarrow (Achillea millifolium), goldenrod (Solidago spp.), fireweed (Epilobium angustifolium), and dock (Rumex spp.). In wet areas, sedges (Carex spp.) are common. Evening primrose (Oenothera biennis), St. John's-wort (Hypericum perforatum), raspberries and blackberries (Rubus spp.), and meadow-sweet (Spiraea alba) are also present. Many other weeds and species of grasses (Graminae) are present in winter but are covered with snow.

## Mammal Distribution

Information on local abundance and distribution of the 7 mammal species we were concerned with was gathered through literature search and consultation with biologists and local residents (Robinson and Fuller 1979). Wolves, lynx, and moose are fairly common on the Ontario side of the river, mainly in the northern hills, and rare on the Michigan side. Bobcats are more numerous on the Michigan side and limited to the lowland/agricultural areas in Ontario. Coyotes, red foxes, and white-tailed deer are common on both sides of the river. A large deer wintering area is present on the southern one-third of Neebish Island (Figure 2). Because of their presence in the area and the reported tendencies of individuals of all of these species to move and disperse across large distances, the ice and water of Whitefish Bay and the St. Mary's River undoubtedly influence distances and directions of movements.

## Ice Conditions

The major portion of the St. Mary's River was covered with thin, clear ice by 5 January 1980; ship traffic continued through 15 January. Throughout the remainder of the winter, ice cover was stable over most of the river. The east-west portion of the river between the International Bridge and the northwest tip of Sugar Island was, however, often ice-free, due in part to emerging warmer water from Lake Superior, currents, the flow of warm water from power plants and industry on both sides of the river. In addition, the man-made channels off northwest Sugar Island (Little Rapids Cut) and part of West Neebish Channel (Rock-cut) remained open all winter, as did a portion of East Neebish Channel. Open water was present at the village of Detour at the south end of the river almost all winter. Most of Whitefish Bay was ice-covered by 31 Janaury, but areas near Pancake Bay were not completely frozen over until 8 March.

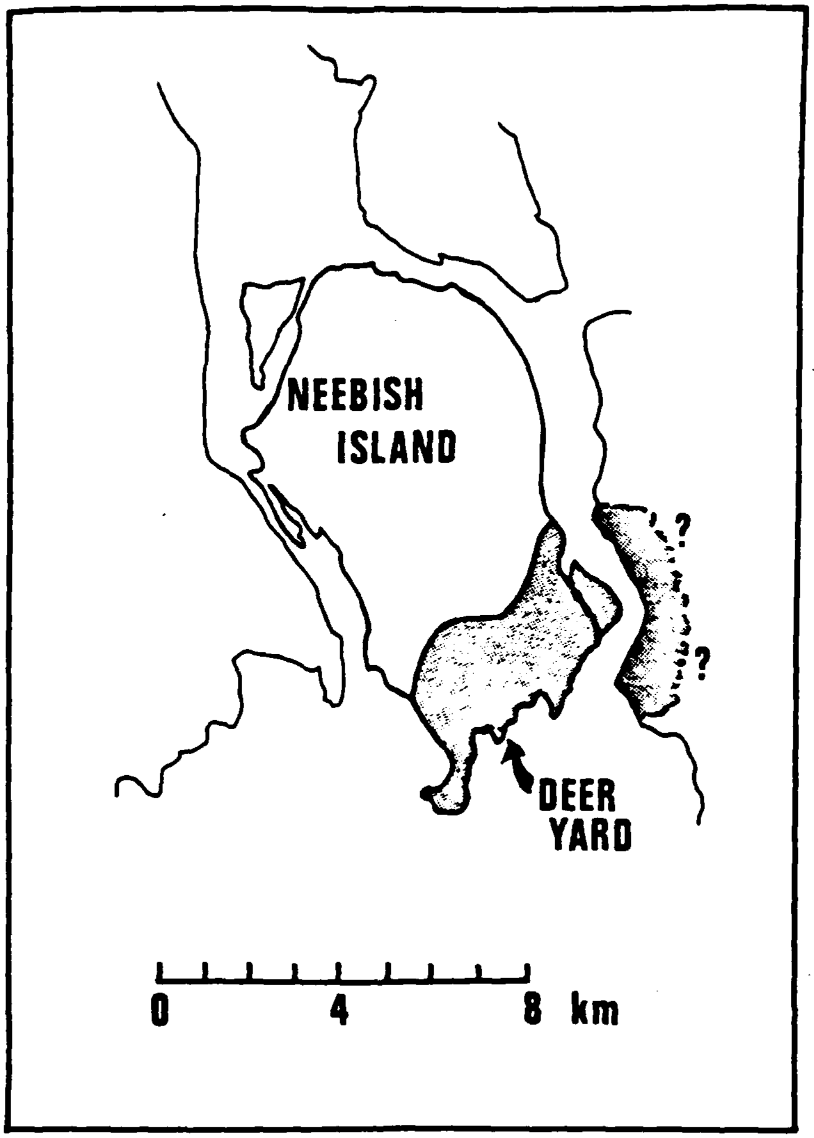


Figure 2. Map of Neebish Island Deer Yard, also showing portion of St. Joseph Island used by wintering deer.

## Winter Shipping

Winter shipping on the St. Mary's River extented to the first week of February in 1972 through 1974. From 1974 through April 1979, the St. Mary's River and Whitefish Bay were open to almost continuous winter shipping. During January, February and March of each winter, an average of 136, 32, and 37 commercial ships per month, respectively, traveled through the locks at Sault Ste. Marie (unpubl. data. U.S. Army Corps of Engineers). These numbers exclude all U.S. and Canadian government vessels.

In 1980, commercial shipping in the study area ceased on 15 January and resumed on 24 March. On 5, 6, and 20 February, the U.S.S. Katmai Bay, a U.S. Coast Guard icebreaker, made trips downriver from Sault Ste. Marie as far south as Hay Point. On 22 March, this ship broke ice all the way to Detour and was followed back upriver by the U.S.S. Mackinaw, a larger icebreaker. On the following day, a ship track was opened through Whitefish Bay. From 24 to 31 March, commercial ships traveled the river only during daylight hours, and though open water was present on the large lakes, ship tracks in channels were filled with floating ice until at least 28 March. Round-the-clock shipping resumed on 1 April.

## Weather

The winter of 1979-80 was slightly less severe than average, judging from statistics compiled at Sault Ste. Marie (Table 1). While average temperatures for the January-March period were 0.4°C colder than average, snow depths contributed to the impression that the winter of 1979-80 was mild. Total snowfall of 159.0 cm in the January-March period was 2.7 cm above normal, but snow depth on the ground in January and February ranged from near zero in early January to 32 cm in late February compared with long-term averages of 30 to 48 cm. Average snow depths in January and February were only 58% of normal. These weather conditions were preceded by a mild and relatively snowless December. Most active mammals therefore were probably less impeded in their movements than in normal winters. The total freezing degree days recorded for the winter of 1979-80 was 1643 compared with the 80-year average of 1815.

Table 1. Summary of Weather Data Recorded at Sault Ste. Marie, Michigan Municipal Airport (National Weather Service)

| Weather parameter | January 1-14 | January 15-31 | February 1-14 | February 15-29 | March 1-15 | March 16-31 | Mean or total |
|---|---|---|---|---|---|---|---|
| Mean daily temperature (C) | | | | | | | |
| 1980 | -9.0 | -9.2 | -12.7 | -9.2 | -9.5 | -0.9 | -8.3 |
| 1941-70 | -9.9 | | -9.3 | | -4.4 | | -7.9 |
| Cumulative freezing-degree-days (F) | 281-503 | 503-793 | 793-1,112 | 1,112-1,356 | 1,356 1,616 | 1,616-1,643 | |
| Mean Daily snow depth (cm) | | | | | | | |
| 1980 | 19.2 | 20.6 | 23.4 | 32.3 | 34.5 | 25.4 | 25.9 |
| 1942-78 | 29.9 | 38.7 | 47.7 | 47.4 | 41.4 | 23.7 | 37.9 |
| Total snowfall (cm) | | | | | | | |
| 1980 | 53.1 | 25.1 | 3.8 | 32.5 | 29.0 | 15.5 | 159.0 |
| 1942-78 | 68.6 | | 49.3 | | 38.4 | | 156.3 |
| % of days snowfall >2 cm - 1980 | 36 | 29 | 0 | 33 | 27 | 19 | 24 |
| Mean daily wind speed (km/hr) | | | | | | | |
| 1980 | 17.6 | 18.4 | 9.5 | 13.3 | 15.2 | 16.0 | 15.1 |
| 1941-70 | 16.2 | | 15.8 | | 16.6 | | 16.2 |
| % of days wind speed > 12 km/hr - 1980 | 64 | 41 | 14 | 60 | 66 | 63 | 51 |
| Average sky cover (%) | | | | | | | |
| 1980 | 63 | 81 | 46 | 73 | 65 | 69 | 66 |
| 1941-70 | 80 | | 74 | | 69 | | 74 |
| % of days cloud cover > 50% - 1980 | 64 | 88 | 57 | 66 | 66 | 75 | 69 |

# PART III: METHODS

## Survey Technique and Location

Winter movements of large land mammals across the St. Mary's River were determined by observing their tracks in snow on the ice. Aerial surveys were conducted to locate tracks on the entire river system, ground surveys were made to check tracks seen from the air, and to study more intensively those areas where tracks were most numerous. From 5 January through 28 March, 87.5 km of the river through which ships would normally travel in winter were surveyed, as were 55.3 km of river through which ships would not pass (Figure 3). The portion of the river between the International Bridge and the northwest tip of Sugar Island was not surveyed because of the open water frequently present there and its proximity to the cities of Sault Ste. Marie, Michigan and Ontario. The other channels where open water persisted through the winter, as noted previously, were also not surveyed.

## Aerial Surveys

Aerial surveys were made in ski-equipped Piper PA-12 or PA-18 Supercub aircraft. On most flights, two observers were present in addition to the pilot. Until 2 February, the absence of permanent snow cover on the ice prevented us from documenting crossings on most of the large windswept lakes. Surveys were thus flown approximately 200 m from shore in these areas, but down the middle of other, narrow channels. Subsequent surveys were flown down the middle of non-shipping channels, and directly above the ship track in other channels.

Animal tracks could most easily be observed when flying slowly (130-150 km/hr) at an altitude of about 45-75 m above the ice. At this altitude, tracks up to 150 m to the side of the flight path could often be detected. Three weather variables often hindered successful observations of tracks on the ice. Snowfalls greater than 3 cm or winds greater than 12 km/hr obscured most tracks made previously. In addition, cloud cover greater than 50 percent made tracks almost impossible to observe from the air, and more difficult to observe on the ground, by eliminating shadows in track impressions. From 15 January through 22 March, two or more of these variables occurred on 32 of 67 days (48%), and at least one occurred on 58 days (87%; unpubl. data National Weather Service, Sault Ste. Marie, Michigan). A semimonthly summary of these weather statistics is presented in Table 1.

Weather and tracking conditions frequently varied within the study area. Often Whitefish Bay was windswept and/or snow was falling there while on other portions of the study area winds were calm enough to allow tracks to remain visible in the snow. Reaches of the river below Neebish Island sometimes experienced no snowfall while the northern reaches would have fresh tracking snow. For these reasons tracking conditions varied from day to day and from one location on the area to another. Coverage of the area by aerial and ground surveys was therefore unequal, depending on the presence of suitable flying weather and tracking conditions.

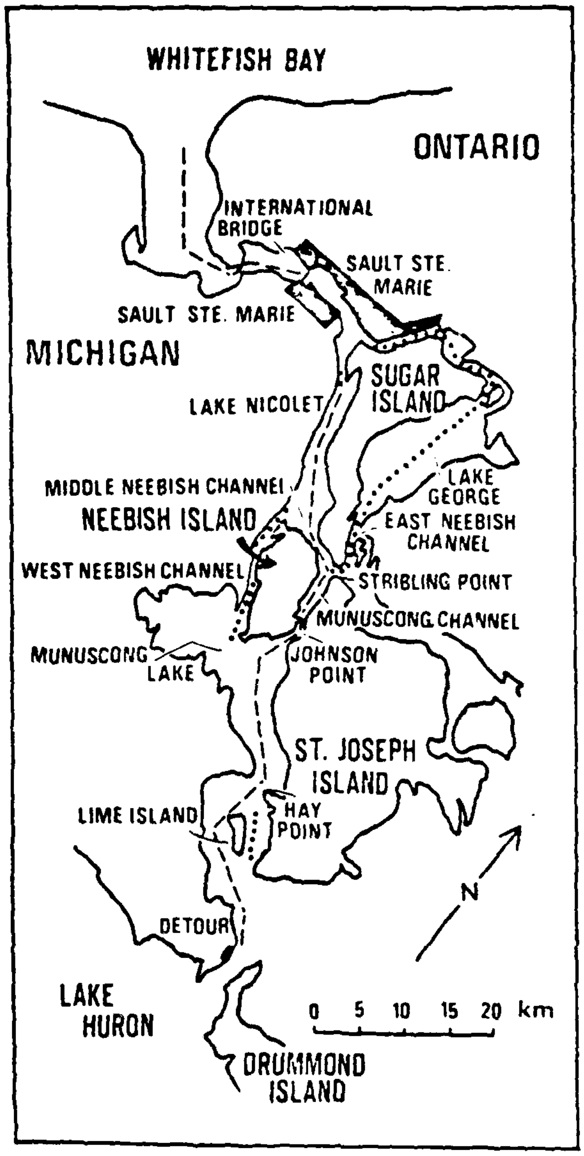


Figure 3. Map of the St. Mary's River showing shipping channels (dashed lines) and non-shipping channels (dotted lines) surveyed for mammal tracks.

## Track Identification From the Air

Identification of tracks to species from the air was difficult during most aerial surveys. After verification of known track patterns, as determined by inspection on the ground, we were able to record from the air tracks of coyotes and red foxes only as tracks of "canids" much of the time. It is possible that a few of the tracks in this classification may also have been made by wolves, lynx, or bobcats. The characteristic pattern of such canid tracks looked, from the air, like a single dotted line crossing the ice. Domestic dogs sometimes had a similar track pattern, but more often, their front and hind feet did not fall into the same track impression as is true with wild canids (Murie 1954). Furthermore, dog tracks almost always originated or terminated at human dwellings on shore. Single deer tracks on shallow snow often looked like canid tracks from the air, but in deeper snow they appeared as an alternating pair of dashed lines, due to marks made from dragging their hooves. Two or more canids might travel in the same footprints over most of their trail, but would occassionally separate for a short distance and were thus identifiable. Multiple deer trails were easily identified by their parallel but intermingling appearance. Many tracks, especially on larger lakes, that were obscured by blowing snow or snowmelt were recorded as "unknown". Direction of travel was sometimes noted when foot drag marks were apparent. Tracks of otters (*Lutra canadensis*), other mutelids, and snowshoe hares (*Lepus americanus*) which were occasionally seen on the ice were distinctive and easily identified (Murie 1954).

## Ground Surveys

Ground surveys on the ice served as checks of aerial surveys and provided more detailed observations in areas where tracks were most common and on days when flying was not possible. Portions of the channel were traversed by walking, skiing, snowshoeing, or snowmobiling. Four areas in particular were surveyed most often: the northern portion of West Neebish Channel, Middle Neebish Channel, the northern portion of East Neebish Channel, and the southern part of Munuscong Channel near Johnson Point (Figure 4). Species identification of tracks followed suggestions of Murie (1954), though during initial work in late January, some fox tracks were probably mistakenly noted as those of coyotes.

Ground surveys were also conducted on land in forested areas adjacent to the four intensive ice survey areas (Figure 4). These areas were surveyed to compare trends in track counts between ice and land travel.

## Data Recorded

Data recorded for all tracks observed greater than 10 m from shore included, whenever possible: species, aerial or ground observation, date, time of day, location of starting and ending points of track, number of animals in group, whether the animals were seen or not, estimated age of track, direction of travel, whether the track crossed the channel or not, type of movement (i.e. direct, meandering, turnback), channel width, distance animals traveled on the ice, onshore depth of track in snow, minimum depth

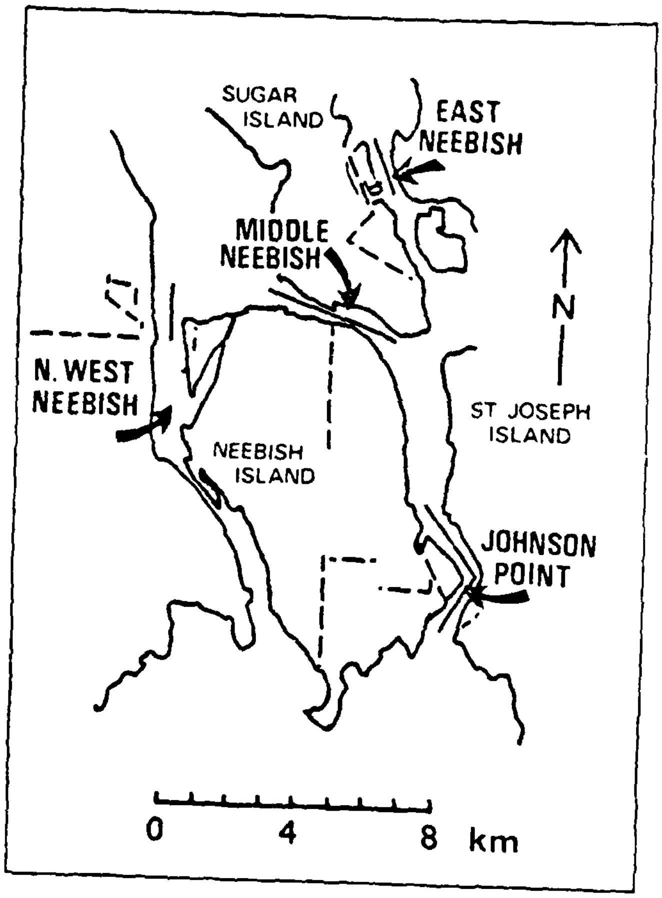


Figure 4. Map of the Neebish Island area showing the location of ground transects on river channels (solid lines) and adjacent forested areas (dashed lines) surveyed for mammal tracks.

of track in snow on the ice, time since last snowfall or strong wind, ice condition, snow condition, habitat type on land, and time since ship passage. During ground transects in forested areas, we recorded similar information for tracks which crossed our survey path. Data for all tracks recorded are given in Appendix B.

Table 2. Summary of Aerial and Ground Survey Effort During Studies of Mammal Movements Across the St. Mary's River, 5 January to 30 March 1980

| | January | February | | March | | |
|---|---|---|---|---|---|---|
| | 5-31 | 2-13 | 17-29 | 3-15 | 19-30 | Total |
| No. of aerial surveys | 9 | 3 | 6 | 6 | 1 | 25 |
| Total no. of hours | 12.2 | 4.8 | 8.2 | 11.5 | 2.3 | 39.0 |
| No. of km surveyed on the ground | | | | | | |
| - on the ice | 25.5 | 29.0 | 9.5 | 10.3 | 5.1 | 79.4 |
| - in adjacent wooded areas | 27.7 | 6.2 | 8.7 | 37.0 | 5.8 | 85.4 |
| Total | 53.2 | 35.2 | 18.2 | 47.3 | 10.9 | 164.8 |

Table 3. Number of Days Each Channel Segment on the St. Mary's River was Surveyed from the Air and from the Ground, 5 January to 31 March 1980

| Channel segment | No. of aerial surveys | No. of ground surveys |
|---|---|---|
| Point Aux Pins to Whitefish Bay | 6 | |
| International bridge to Point Aux Pins | 9 | 1 |
| Lake Nicolet | 21 | 1 |
| Middle Neebish Channel | 21 | 6 |
| N. Munuscong Channel | 21 | |
| Johnson Point | 21 | 10 |
| S. Neebish Island | 21 | 1 |
| Munuscong Lake to Hay Point | 14 | |
| Hay Point to Detour | 11 | |
| N. Sugar Island | 8 | |
| Lake George | 5 | |
| East Neebish Channel | 15 | 5 |
| Stribling Point | 14 | 1 |
| N. West Neebish Channel | 17 | 9 |
| S. West Neebish Channel | 14 | 1 |
| E. Lime Island | 8 | |
| Whitefish Bay | 5 | |

## PART IV: RESULTS

### St. Mary's River

#### Number of Crossings

No river crossings were detected before 15 January or after 22 March due to poor tracking conditions on the ice. During the period between these dates, we located 554 individual sets of mammal tracks which crossed the river at various locations. Figures 5 through 12 are maps showing all crossings by various species that we observed in aerial and ground surveys on the St. Mary's River from 15 January through 24 March 1980. Two hundred eighty one (51%) of the tracks were of white-tailed deer and 182 (33%) were of coyotes, red foxes, dogs, and unknown canids (Table 4). Only one bobcat track was identified, and none of wolves, lynx or moose. Eighty-five tracks (15%) of large mammals crossing the ice were recorded as "unknown"; 4 otter tracks and 1 of an unknown mustelid were also noted. In addition, we located tracks of 218 animals on the ice more than 10 m from shore, which either did not cross a channel, or may have crossed but were not detected as doing so because the tracks were obscured by wind or snow. Many other tracks of this type were likely not counted, because of our aerial survey technique which involved flying directly over the ship track or the center of other channels, and did not include close coverage of shoreline zones.

#### Weighting of Data to Account for Uneven Sampling

The total number of tracks counted (554) crossing the river represents a minimum number of crossings. The actual number of crossings is greater because tracks of animals which crossed on snowless ice or shortly before or during a snowfall were not observed. We therefore considered the number of tracks per day after a snowfall as a reasonable measure of the rate of crossing. The time between the last track-obliterating wind or snowfall and the survey time was recorded, and the number of tracks counted could then be calculated as tracks/24 hours, or tracks/day. On some days 50 km of the area would be sampled, on others 70 km and on others 30 km, etc. depending upon weather and the previous day's sampling. In order to make samples of different lengths comparable the length of the sample was also used as a denominator, so that the number of tracks/km/day was used as a standard unit to compare crossing rates from one part of the winter to another and to compare crossing rates between various portions of the study area.

For example, suppose a 2 km stretch of channel near Neebish Island was surveyed 12 hours after a snowfall (half a track-visibility-day) and 8 tracks were found. This would result in a count of 8 tracks

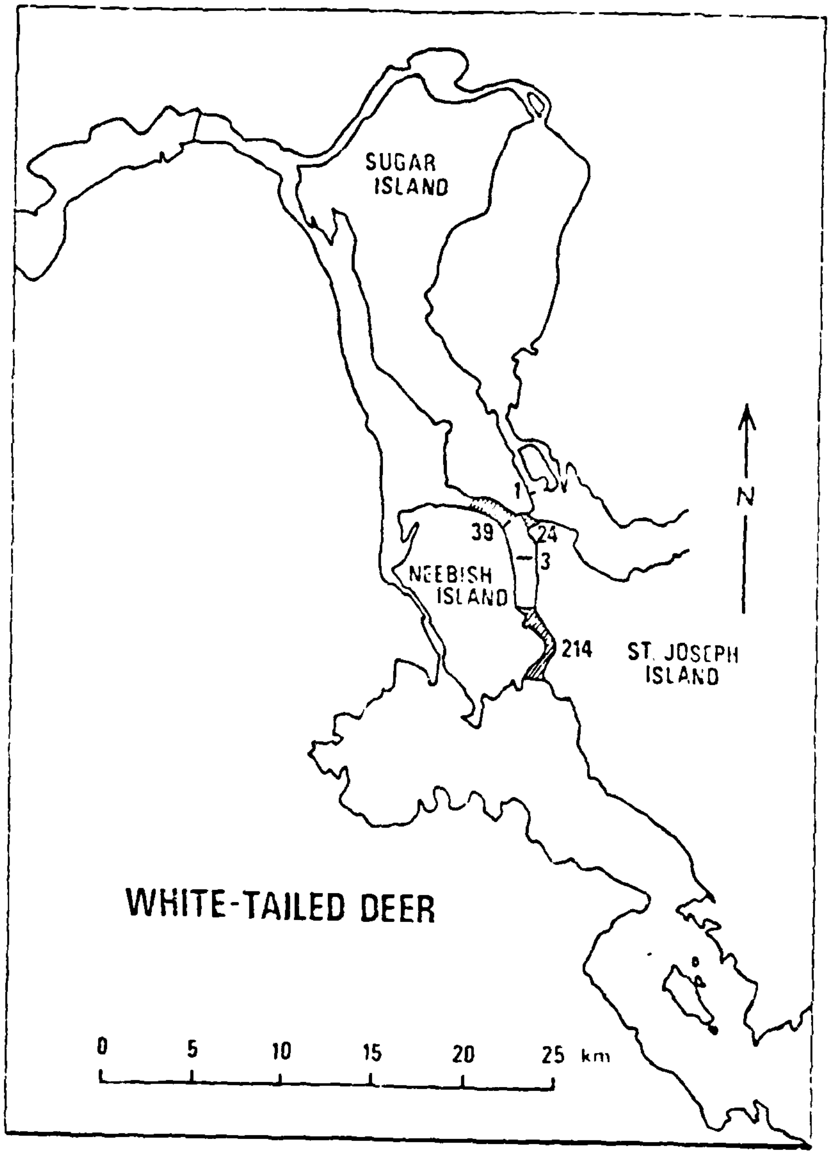


Figure 5. Locations of crossings of the St. Mary's River by white-tailed deer.

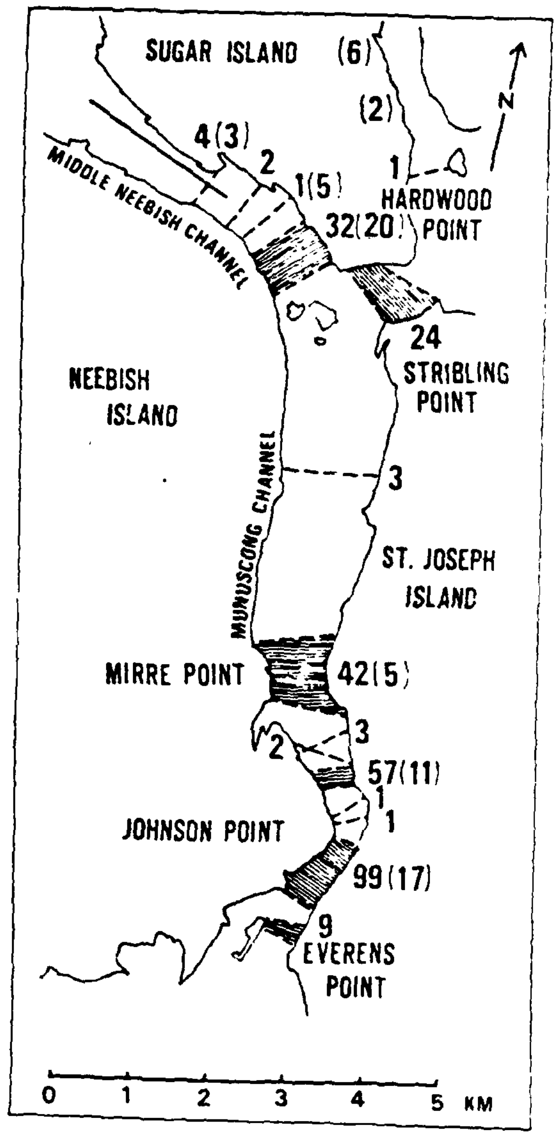


Figure 6. Detailed map of crossings by deer in the Neebish Island area. The observed number of turnbacks by deer at each location is in parentheses.

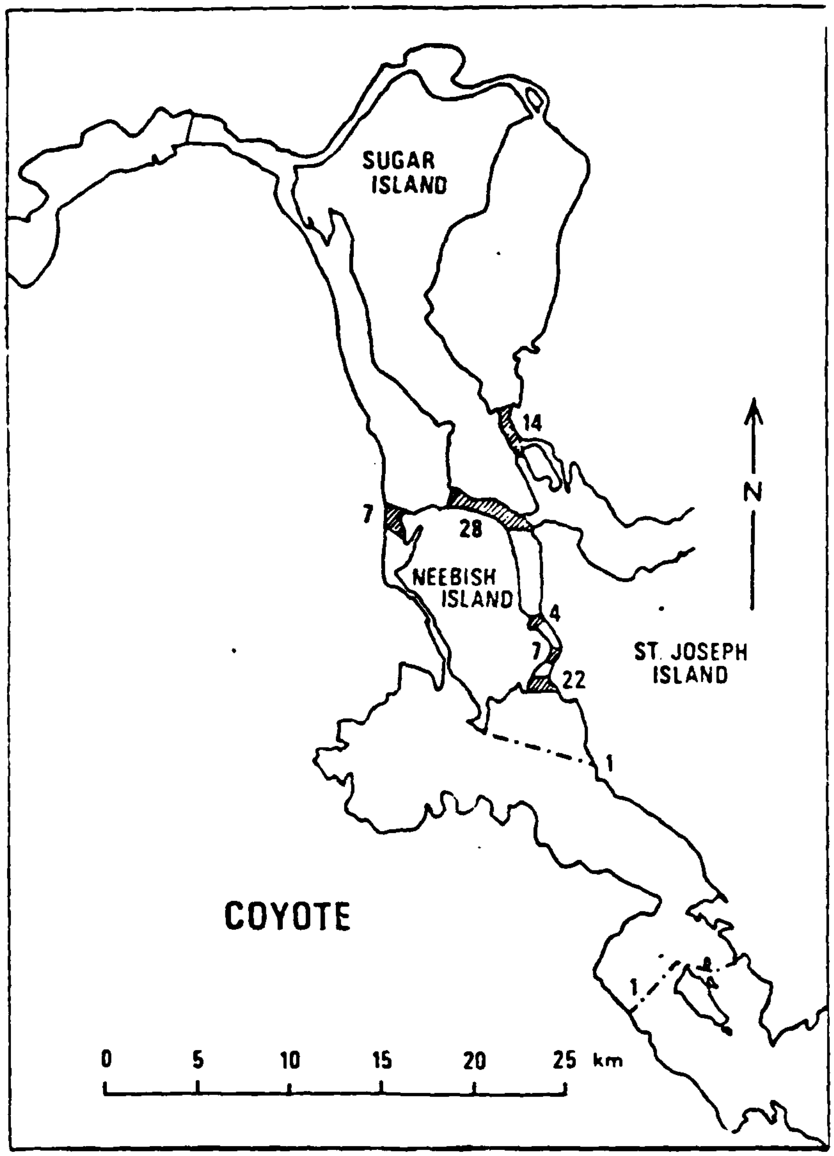


Figure 7. Locations of crossings of the St. Mary's River by coyotes.

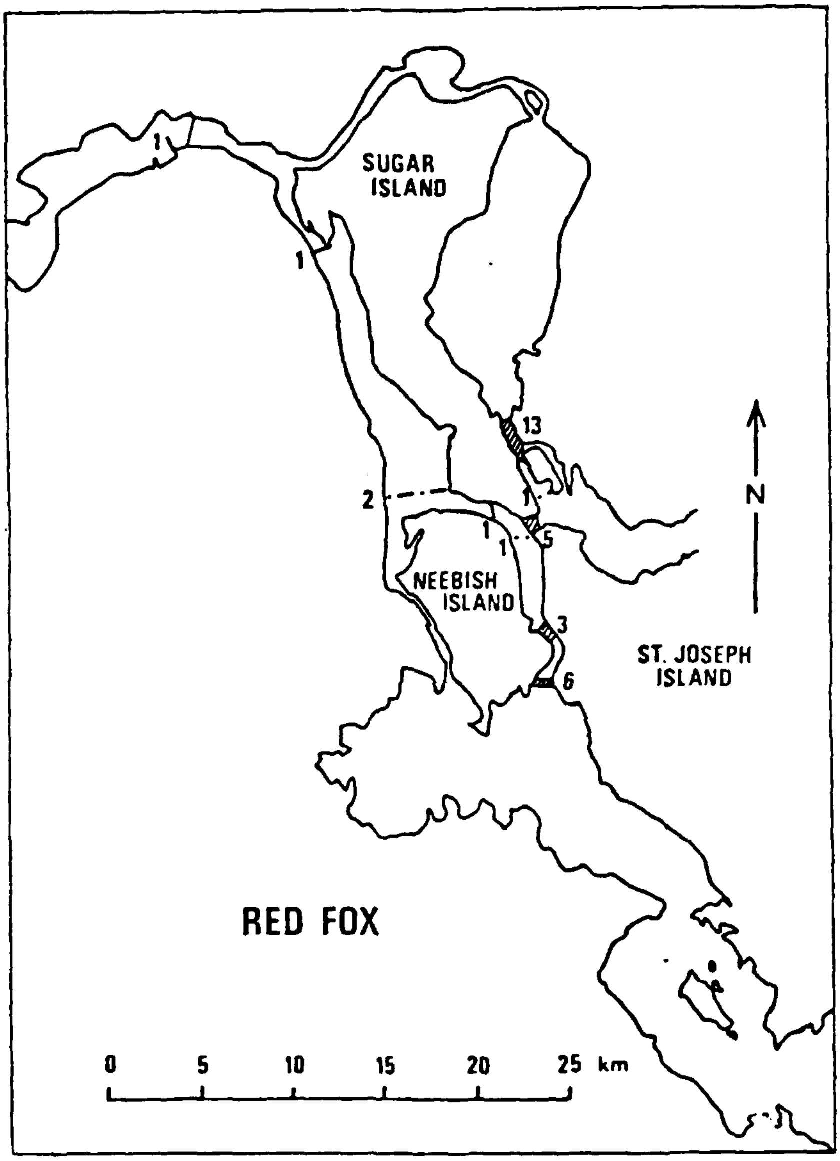


Figure 8. Locations of crossings of the St. Mary's River by red foxes.

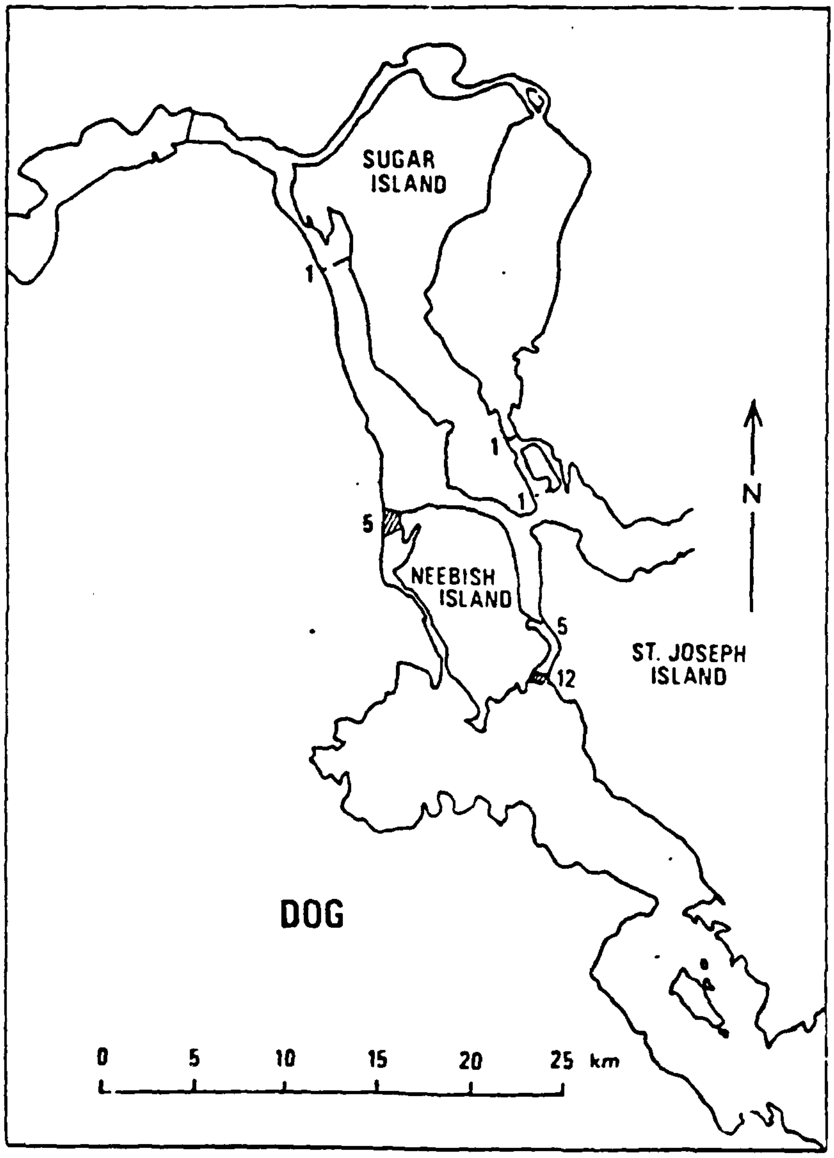


Figure 9. Locations of crossings of the St. Mary's River by dogs.

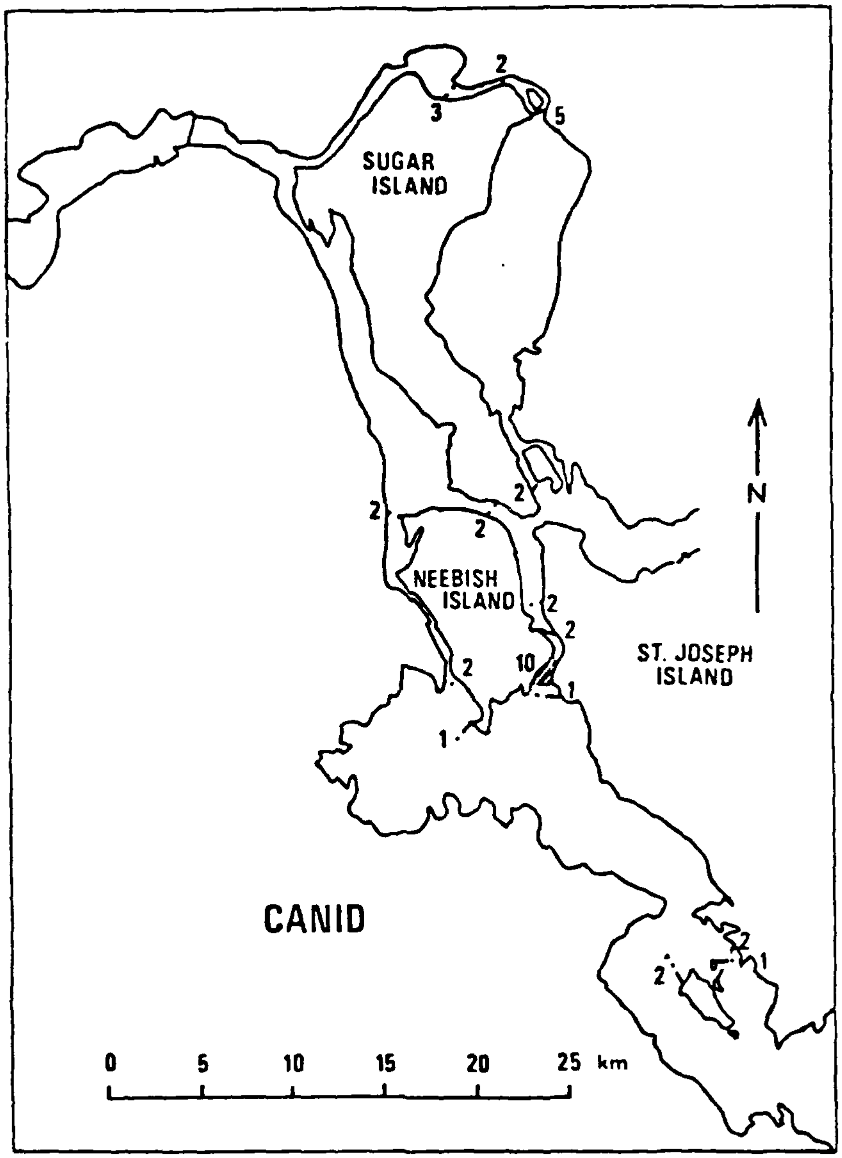


Figure 10. Locations of crossings of the St. Mary's River by unidentified canids.

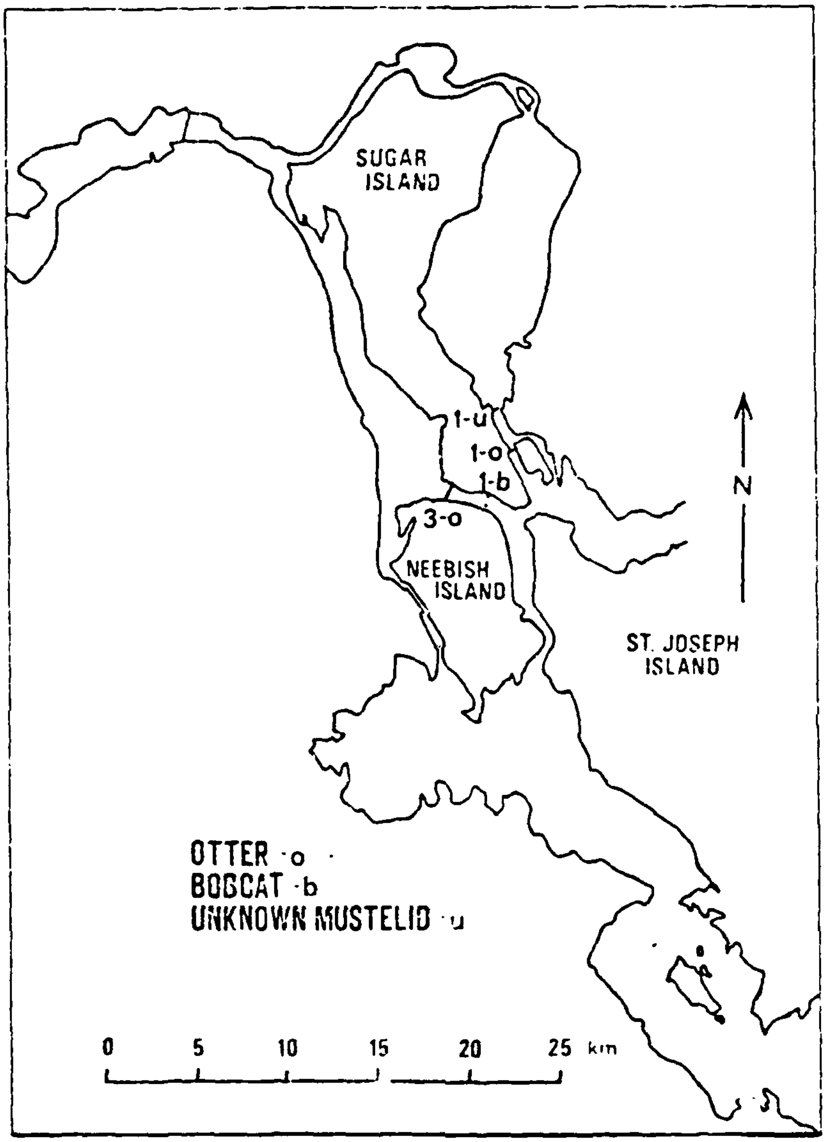


Figure 11. Locations of crossings of the St. Mary's River by otter, bobcat and unknown mustelids.

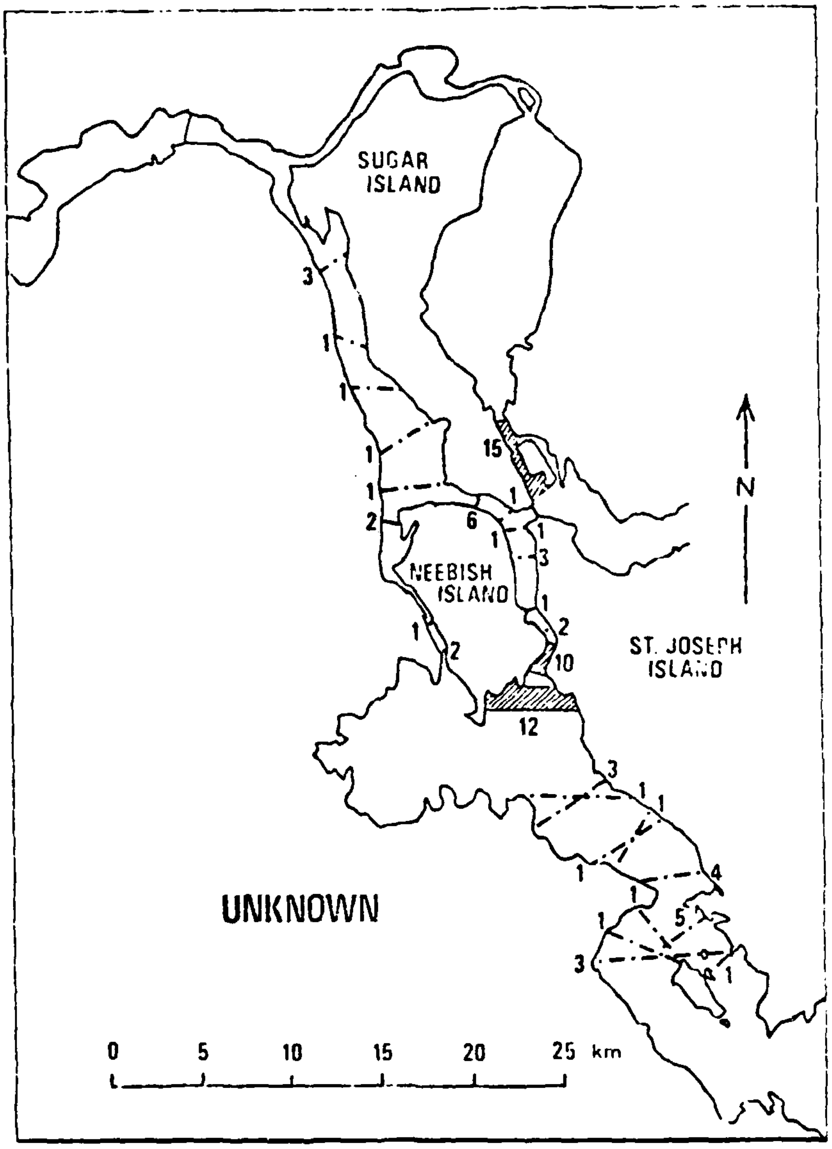


Figure 12. Locations of crossings of the St. Mary's River by unknown mammals.

Table 4. Mean Number of Crossings/km/day (x 10) by Mammals on the St. Mary's River, 15 January to 22 March 1980. Number of km-days for Which Tracks Were Recorded in Each Period is in Parentheses

| Species | Total no. of crossings | January 15-31 (95.3) | February 1-13 (532.9) | February 16-29 (271.7) | March 2-15 (440.8) | March 17-22 (42.7) |
|---|---|---|---|---|---|---|
| Coyote | 84 | 2.52 | 0.37 | 0.10 | 0.05 | 0.05 |
| Red fox | 34 | 0.08[a] | 0.17 | 0.01 | 0.03 | 0.00 |
| Unknown canid[b] | 39 | 0.00 | 0.13 | 0.08 | 0.66 | 0.13 |
| Dog | 25 | 0.33 | 0.03 | 0.02 | 0.05 | 0.06 |
| Deer | 281 | 1.00 | 0.93 | 0.49 | 0.78 | 1.82 |
| Unknown[c] | 85 | 0.54 | 0.90 | 0.12 | 0.08 | 0.00 |
| Total | 548[d] | 4.47 | 2.53 | 0.82 | 1.65 | 2.06 |

[a] During January, some fox tracks were likely mistakenly identified as those of coyotes and are included in the coyote January total.

[b] Most likely coyote or red fox; possibly wolf, bobcat, or lynx.

[c] In January and early February some tracks classified as "unknown" would later have been classified as "unknown canid".

[d] Total does not include 1 bobcat, 4 otters, and 1 unknown mustelid.

per 2 km per half day, or 4 tracks/km/0.5 days, or 8 tracks/km/day. If a 10 km stretch of channel west of the International Bridge was surveyed 2 days after a wind had subsided (2 track-visibility-days) and 10 tracks were counted, there would be 10 tracks per 10 km per 2 days, or 1 track/km/2 days, for a rate of 0.5 tracks/km/day. This assumes that crossing rates are uniform throughout the period between snowfall or wind and sampling time.

Temporal Distribution of Crossings

General Distribution - Considering all species together, crossings of the St. Mary's River were the greatest in late January, decreasing to a low in late February, and increasing until the ice was broken in late March (Table 4). Seventy-nine per cent of the crossings occurred in late January, early February, and late March.

Coyotes and Red Foxes - Coyotes and red foxes were generally more active on the ice during late January and early February; crossing activity of both species was low for the rest of the winter (Table 4). The high crossing rate of coyotes in late January is probably inflated somewhat by two factors. Some fox tracks were mistakenly identified as those of coyotes in late January and were included in the coyote track total for that time period. Also a very high crossing rate was calculated for East Neebish Channel (37.6 tracks/km/10 days) based on small sample size (5 tracks found in 1.9 km, 0.7 days after a snowfall). Despite these two factors, we believe that the overall pattern of high activity in late January and early February followed by lower activity in late February and early March is a reflection of actual behavior of coyotes and foxes.

Unknown Canids - The pattern of unknown canid crossings was probably similar to that of coyotes and foxes; before late February, many tracks were classified as unknown rather than more accurately as unknown canid. The high crossing rate for canids in early March reflects increased activity noted at Johnson Point, combined with six tracks observed on the only two surveys conducted at the east end of the channel north of Sugar Island. Poor ice conditions or priority for surveys in other areas precluded making additional surveys in this area during other time periods. It is likely though, that crossings there followed a seasonal pattern similar to other areas.

Dogs - Occurrences of crossings by domestic dogs were low through most of the winter. The relatively high rate recorded in late January was the result of two pairs of dogs crossing and immediately recrossing the channel at Johnson Point, and northern West Neebish Channel.

Deer - Deer crossings were high in late January and early February, lower in late February and early March, and highest in late March. The increase observed in late March was due to a large number of deer crossing in both directions near Johnson Point on 18-19 March.

Unknown Mammals - Crossings of unidentified mammals were highest in early February when little snow fell and tracks on large lakes were present for longer periods of time, but were still not clear enough to identify to species.

## Track Depths in Snow

It might be assumed that deep snow in the woods adjacent to the river would encourage animals to go out onto the ice to travel from one place to another. Wolves on Isle Royale are known to use the ice for travel when the snow is deep (Mech 1970; Peterson 1977). On the St. Mary's River disruption of ice cover by winter shipping might be expected to have a more pronounced effect during winters or during periods of the winter when snow is deep on land. The winter of 1979-80, however, was characterized by shallow snow. The maximum average depth to which animals sank (25.3 cm for deer in early February) probably had no effect on directing travel onto the ice. Table 5 summarizes track depths of the various species and might be used for comparative purposes with other winters.

## Temporal Distribution of Tracks in the Woods

To determine whether a decrease in animal activity on the ice is caused by winter shipping there should be a comparison between activity on land, where shipping presumably would have little influence. If activity on land continues throughout the winter at a particular rate but declines on the river, we might attribute the decline to a variable that occurs on the river. If, on the other hand, similar declines on activity occur both on land and on the ice, the decline might be attributed to something other than shipping or some other variable that might affect activity on the ice. In 1980, seasonal activity of canids in the woods was similar to that observed on the ice. Tracks were encountered most frequently in late January and occurred with decreasing frequency throughout the rest of the winter (Table 6). Trends in deer track numbers were not apparent, likely because of the incomplete sampling of areas during each time period and the seasonal changes in geographic distribution of deer in the different areas. Seasonal differences in numbers of deer tracks in wooded areas closely corresponded to changes in crossing rates on adjacent channels, as will be described in the following section.

## Geographic Distribution of Crossings

General Distribution - Table 7 shows the rates of animal crossings on various channel segments. Of all crossings recorded on the St. Mary's River, 90 per cent were on channels adjacent to Neebish Island. Four channel segments, two shipping and two non-shipping, were the most heavily traversed by mammals throughout the winter: Middle Neebish Channel (3.6 crossings/day), Munuscong Channel near Johnson Point (11.3 crossings/day), East Neebish Channel between Stribling Point and Hardwood Point (2.1+ crossings/day), and the northern portion of West Neebish Channel (1.1 crossings/day). In the first three of these areas, crossings by deer predominated, but coyote crossings were abundant. All channels had at least one crossing. West of the International Bridge, the only crossing noted was by a red fox; but, up to 50 ice-fishing shanties were present on the narrowest portion of the channel, much of the shoreline was lined with houses, and during much of the winter, portions of the channel would open up and then refreeze. Thus, both the likelihood that animals might cross, and the opportunities for observing tracks there were low. No crossings on the main body of Lake George were recorded, but tracks were seen crossing near its inlet and outlet at either end. The several crossings of Lake Nicolet occurred at both ends, and across the wider portions of the lake. Crossings of Munuscong Lake and

Table 5. Mean Depth (cm) of Tracks in Snow for Mammals Crossing or on Land Adjacent to the St. Mary's River, 15 January to 22 March 1980. Number of Groups of Tracks ($\geq$ 1 individual at 1 location) Shown in Parentheses

| | | January | February | | March | | Weighted |
|---|---|---|---|---|---|---|---|
| Location | Species | 15-31 | 1-14 | 15-29 | 1-15 | 16-31 | mean |
| Mean minimum depth on ice | Deer | 2.0(7) | 5.3(49) | 11.1(7) | 6.3(11) | 1.7(13) | 5.3(87) |
| | Coyote | 4.2(26) | 5.1(39) | 10.0(3) | 1.3(3) | 2.0(2) | 4.5(73) |
| | Red fox | -----[a] | 5.0(32) | ----- | 11.0(2) | ----- | 8.0(34) |
| | Canid[b] | ----- | 5.0(3) | 14.0(1) | 5.0(1) | 2.0(1) | 6.5(6) |
| | Unknown | 2.8(15) | 5.2(21) | 9.0(2) | ----- | ----- | 5.7(38) |
| Mean depth at departure or arrival points | Deer | 8.4(7) | 25.3(18) | 5.0(7) | 9.5(6) | ----- | 12.1(38) |
| | Coyote | 7.2(19) | 4.9(19) | 7.5(2) | 15.0(2) | ----- | 8.7(37) |
| | Red fox | ----- | 4.2(9) | ----- | 10.5(2) | ----- | 7.4(11) |
| | Canid | ----- | ----- | ----- | ----- | 3.5(2) | 3.5(2) |
| | Unknown | ----- | 4.0(1) | ----- | ----- | ----- | 4.0(1) |

Table 5. (concluded)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mean depth in wooded areas | Deer | 14.1(7) | ----- | 13.7(10) | 6.0(99) | 8.9(7) | 13.1(123) |
| | Coyote | 2.4(25) | ----- | 5.0(2) | 7.0(4) | ----- | 4.8(31) |
| | Red fox | ----- | ----- | 12.3(3) | 12.2(2) | 2.0(1) | 8.9(6) |

[a] Transect not surveyed or depth not recorded.

[b] Includes coyotes, red foxes, and unidentified canids.

Table 6. Mean Number of Tracks/km/day of Deer (n=201) and Canids[a] (n=30) Crossing Transects in Wooded Areas Adjacent to the St. Mary's River, 14 January to 25 March 1980. Number of km-days is shown in parentheses

| Species | Adjacent channel segment[b] | January | February | | March | | Total |
|---|---|---|---|---|---|---|---|
| | | 14-28 | 11 | 27-28 | 3-10 | 19-25 | |
| Deer | N. West Neebish | 0(20.5) | 0(3.1) | 0(3.5) | 0(17.9) | -----[c] | 0(45.0) |
| | East Neebish | 0(1.0) | ----- | 1.1(3.5) | 2.1(7.3) | 2.0(2.5) | 1.8(14.3) |
| | Middle Neebish | 5.2(4.4) | ----- | ----- | 0(11.4) | 0.8(2.5) | 1.4(18.3) |
| | Johnson Point | ----- | ----- | ----- | 7.1(19.7) | 4.3(3.0) | 6.7(22.7) |
| | Mean | 0.9(25.9) | 0(3.1) | 0.6(7.0) | 2.8(56.3) | 2.5(8.0) | 2.0(100.3) |
| Canid | N. West Neebish | 0.7[d] | 0.7 | 0.3 | 0 | ----- | 0.4 |
| | East Neebish | 4.1 | ----- | 0.9 | 0.4 | 0.4 | 0.8 |
| | Middle Neebish | 0.7 | ----- | ----- | 0 | 0 | 0.2 |
| | Johnson Point | ----- | ----- | ----- | 0 | 0 | 0 |
| | Mean | 0.9 | 0.7 | 0.6 | < 0.1 | 0.1 | 0.3 |

[a] Includes coyote, red fox, and unidentified canid tracks.

[b] Transect locations are shown in Figure 2.

[c] Transect not surveyed.

[d] Sample size (km-days) same as for deer.

Table 7. Mean Number of Crossings/km/day (x 10) by Mammals on Various Segments of the St. Mary's River, 15 January-22 March 1980. Total Number of km-days for Each Segment is Shown in Parentheses

| Channel segment[a] | Channel length (km) | Species | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Coyote | Red fox[b] | Unknown canid | Dog | Deer | Unknown | Total |
| Shipping channels | | | | | | | | |
| W. of International Bridge (86.8) | 23.3 | | 0.12 | | | | | 0.12 |
| Lake Nicolet (288.3) | 16.3 | | 0.07 | | 0.03 | | 0.24 | 0.34 |
| Middle Neebish Channel (106.6) | 5.0 | 2.35 | 0.28 | 0.19 | | 3.66 | 0.75 | 7.22 |
| N. Munuscong Channel (90.8) | 5.1 | 0.11 | | 0.11 | | 0.77 | 0.66 | 1.65 |
| Johnson Point (104.8) | 4.1 | 2.77 | 0.95 | 1.05 | 1.62 | 20.04 | 1.05 | 27.48 |
| S. Neebish Island (64.1) | 3.6 | 0.31 | 0.16 | 0.47 | | | 1.87 | 2.81 |
| Munuscong Lake to Detour (287.9) | 30.1 | 0.07 | | 0.07 | | | 0.66 | 0.80 |
| Total shipping channel (1,029.3) | 87.5 | 0.31 | 0.11 | 0.11 | 0.08 | 1.19 | 0.48 | 2.28 |

Table 7. (concluded)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Non-shipping channels** | | | | | | | | |
| N. Sugar Island and Lake George (91.8) | 31.6 | | | 1.09 | | | | 1.09 |
| East Neebish Channel (116.1) | 6.2 | 1.21 | 0.78 | 0.17 | 0.17 | 0.09 | 0.95 | 3.36 |
| Stribling Point (14.1) | 1.0 | | 2.84 | | | 17.02 | 0.71 | 20.57 |
| N. West Neebish Channel (34.2) | 2.3 | 2.05 | | 0.58 | 1.46 | | 0.58 | 4.69 |
| S. West Neebish Channel (72.9) | 9.3 | | | 0.41 | | | 0.54 | 0.96 |
| E. Lime Island (25.0) | 4.9 | | | 0.88 | | | 0.80 | 1.68 |
| Total non-shipping channels (354.1) | 55.3 | 0.22 | 0.14 | 0.81 | 0.08 | 0.32 | 0.31 | 1.88 |
| Total all channels (1,383.4) | 142.8 | 0.28 | 0.12 | 0.38 | 0.08 | 0.85 | 0.41 | 2.12 |

[a] Channel segments are shown in *Figure 2*.

[b] During January, some fox tracks were likely mistakenly identified as those of coyotes and are included in the coyote total.

[c] Most likely coyote or red fox; possibly wolf, bobcat or lynx.

the St. Mary's River to Detour occurred only in two areas, 3 to 5 km north of the narrows at Hay Point where some crossings were noted in late January, and between Lime Island and Round Island 1.7 km to the northwest where crossings occurred throughout the winter.

Coyotes, Foxes and Unknown Canids - Some tracks of canids were found on every channel segment surveyed, but most were at Munuscong Channel (55 tracks), Middle Neebish Channel (31 tracks), East Neebish Channel (29 tracks), and northern West Neebish Channel (9 tracks). Coyote crossing rates were highest and seasonally most consistent at Johnson Point. In only three other areas were any crossings detected from late February through late March, and in those three areas only eight tracks were counted during that time. Four foxes crossed near St. ibling Point on 6-7 February accounting for the high total rate observed there. Fox tracks were most consistently found crossing East Neebish Channel. Unidentified canid tracks were most common on Johnson Point. A high rate was also recorded between the northeast end of Sugar Island and the Ontario mainland in early March, when our only two surveys of that particular channel segment occurred.

Dogs - All recorded dog crossings were close to occupied human dwellings, especially houses across from Johnson Point and at the northern end of West Neebish Channel near Dunbar.

Deer - Deer crossings were noted in only five areas, and in one of these areas, East Neebish Channel, only one crossing occurred (Figure 6). Crossings at the south end of Sugar Island near Stribling Point and across Middle Neebish Channel, as well as across the northern part of Munuscong Channel, occurred only during late January and early February. Crossings between Neebish Island and St. Joseph Island, near Johnson Point and Mirre Point, occurred from late January through early March at a similar rate (12.9-27.1 tracks/km/10 days) and increased to 63.3 tracks/km/10 days in late March. Most crossings near Mirre Point (27 of 42) occurred in late March.

Unknown Mammals - Numbers of crossings of unidentified mammals were highest in areas where we were unable to verify track identification from the ground. These were often on the larger lakes where tracks were more easily obscured by wind and snow or where the small number of tracks in isolated locations made ground checking unfeasible.

Comparison with Woods Transects - The mean number of tracks encountered in adjacent forested areas showed seasonal patterns of distribution similar to those observed on the ice (Table 6). No deer tracks were seen in the woods near the northern part of West Neebish Channel, a few were seen near East Neebish Channel, many were noted near Middle Neebish Channel in late January, but none in March, and high numbers of tracks were seen near Johnson Point in February and March. Numbers of canid tracks were highest near East Neebish and the north part of West Neebish Channels. No canid tracks were found in forested areas near Johnson Point or Middle Neebish Channel in March.

## Channel Widths and Crossing Rates

The width of the river channel appeared to be an important factor in determining where animals would cross. A chi-square test was applied to determine whether the number of crossings at various channel widths was proportional to the occurrence of the channel widths available. The frequencies of occurrence of channel widths and of crossings are shown in Figure 13. The null hypothesis is that there is no difference between the frequency of occurrence of channel widths and the proportion of animal crossings which occur at such widths. The test revealed that the numbers of crossings by mammals were not proportional to available channel widths ($X^2$ = 294.3, 5 d.f. p < .001). Inspection indicates that crossings of all species were disproportionately frequent at narrower channels and disproportionately infrequent at wider channels. Similar tests were applied to individual species.

Deer, which crossed in fewer areas, also crossed channels of narrower width than did other species. Three deer did cross a channel 1,400 m wide, but 96 per cent of the deer crossings were in channels <1,000 m wide. Canids (coyotes, foxes, and unknown canids) all crossed wider channels much more readily; 35 per cent of their tracks were across channels >1,000 m wide. Maximum channel widths crossed by an individual coyote, fox, or unknown canid were 5.5 km, 3.1 km, and 3.5 km, respectively. The distribution of crossings of unidentified mammals (unknowns) was nearly significantly different than expected if crossings were random (P = .06). The larger proportion of such tracks across wide channels was again due to the fact that unidentified tracks were most common on large lakes, which have greater channel widths and winds and snow which obscured tracks more often than on narrower channels.

Habitat Use

The distribution and proportion of 5 different habitat types (cedar-upland conifer, mixed deciduous conifer, deciduous forest, marsh-alder-willow swamp, and field-brush) on the shorelines at Middle Neebish Channel, Munuscong Channel, Stribling Point and Johnson Point were recorded and compared with proportion of habitat types from which mammals crossing the channel either departed from or arrived at (Table 8).

As with channel widths, a chi-square test was performed to determine whether the proportion of habitat use by animals merely reflected the proportion of habitat types available or whether there was some tendency for animals to select certain habitat types. The null hypothesis for the test was that there is no difference between the proportion of various habitat types available and the frequency of occurrence of use by mammals as departure and arrival sites on the shore. The $X^2$ value of 361.8 indicates that the null hypothesis should be rejected at the .001 level of probability, and we conclude that animals occurred on the shoreline non-randomly with respect to habitat availability.

Habitat use by each species was significantly different from habitat availability (P < .005). Deciduous cover was little used by any species. This cover type was most abundant in the northern portion of Munuscong Channel and may have accounted for the low number of crossings there. Mixed coniferous-deciduous cover was used most often by canids (coyotes, foxes, and unknown canids), and open fields were used very little. Deer utilized the cedar-conifer types most often. This habitat was distributed mostly from Mirre Point south around the bend of Johnson Point on Neebish Island. On St. Joseph Island, the dense conifer habitat was even more restricted; across from Johnson Point, arrival or departure

Table 8. Percent of Occurrence of Habitat Types at Departure and Arrival Sites of Mammals Crossing at Middle Neebish Channel, Munuscong Channel, Stribling Point, and Johnson Point from 15 January through 22 March 1980. The Percent of Habitat Use by Each Species is Significantly Different ($P<.005$) from Habitat Availability. The Percent of Habitat Available is Shown in Parentheses

| | | Percent of habitat type used | | | | |
|---|---|---|---|---|---|---|
| Species | No. of departures and/or arrivals | Cedar-upland conifer (19.4) | Mixed deciduous-conifer (14.1) | Upland and lowland deciduous (49.3) | Marsh-alder willow swamp (7.0) | Field-brush (10.3) |
| Canids[a] | 86 | 27.9 | 47.6 | 11.6 | 7.0 | 5.8 |
| Deer | 464 | 60.3 | 13.6 | 11.6 | 11.9 | 2.5 |
| Dog | 22 | 45.5 | 9.1 | 9.1 | | 36.4 |
| Unknown | 50 | 60.0 | 22.0 | 2.0 | 2.0 | 14.0 |

[a] Includes coyotes, red foxes, and unindentified canid tracks.

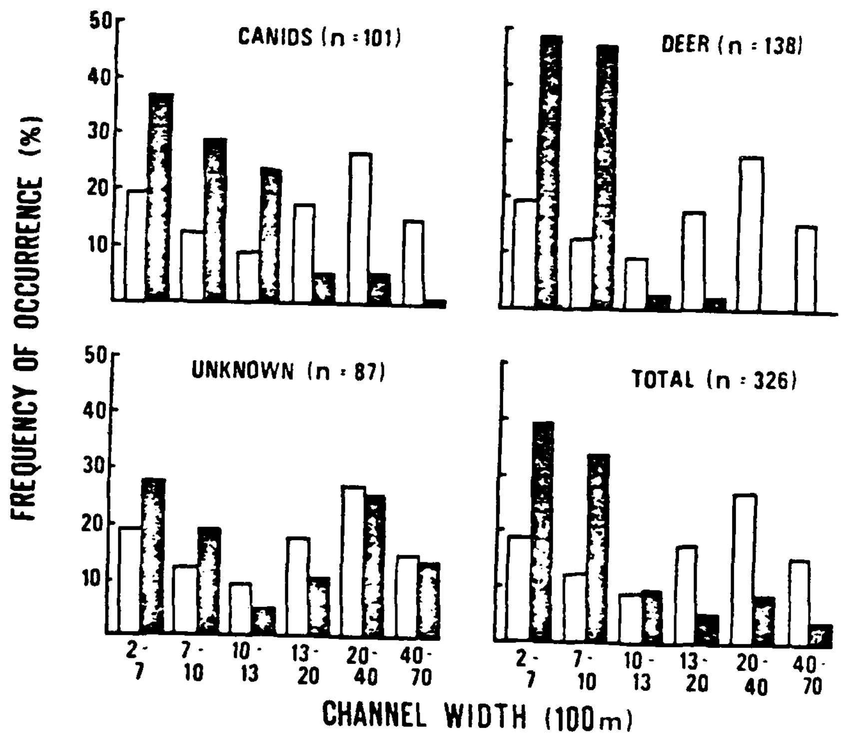


Figure 13. Frequency of occurrence of mammal crossings (solid bars) compared with available channel widths (open bars). "Canids" includes 48 coyte, 19 red fox, and 34 unidentified canids.

sites of deer (Figure 4) reflected almost exclusively the distribution of this cover type. Deer crossings near Stribling Point, Hardwood Point, and northeast Neebish Island accounted for use of deciduous, mixed deciduous-conifer and marsh-alder-willow habitats. Open fields were little used by deer. In contrast, a high proportion of dog crossings began or ended in field habitat.

Residences occur through all habitat types, but most are on either side of Munuscong Channel near Johnson Point, and at Hardwood Point. Few houses at Johnson Point are inhabited during winter, and deer tracks were commonly found in yards of these houses throughout the winter.

Directions of Crossings

Significant tendencies to cross a channel in one direction were found in only two areas. From 26 January to 9 February, 29 of 37 deer (78%) crossed south from Sugar Island to Neebish Island. A chi-square test was used to determine what the probability is that 29 of 37 crossings going in one direction would occur by chance if directional movement were random. The expected value would be a 50:50 ratio, or 18.5 crossings in either direction. A chi-square value of 11.92 indicates a probability of less than .05 that direction of crossings was random, suggesting that the deer were moving from Sugar Island to Neebish. During the same period, 10 other deer attempted to cross to Neebish Island but were turned back at the shipping lane.

On 6-7 February, 15 of 21 deer (71%) crossed northwest from Stribling Point on St. Joseph Island to Hardwood Point on Sugar Island ($X^2 = 3.86$, $P < .05$). No other species showed a directional tendency in crossing the channels. Of 171 deer crossings near Johnson Point for which the direction of travel could be discerned, no significant tendency to cross one way or the other was noted during any of the five time periods (late January to late March), even though crossing rates were high.

Estimated Total Number of Crossings

Tracks were found on at least some part of the river on 36 of 68 days during the 15 January-22 March period. Because we surveyed only when weather conditions were suitable, estimates of the total numbers of animals crossing the St. Mary's River during the entire winter can not be directly derived from the rates we observed. At least two of three weather variables considered a hindrance to the observation of mammal tracks (daily snowfall >2 cm, mean wind speed >12 km/hr, and >50% cloud cover) occurred on 21 of the 32 days we did not collect data. During these 21 days when weather was more severe, we assumed that animals were less likely to move than on days with good weather, but that their activity was not zero. Our best estimate is that crossing rates during those days, for all species, were approximately half of the observed rates. We also assumed that species and rates of crossings on the 11 days with more favorable weather, were probably similar to those on the days when tracks were located.

We used these correction factors to estimate the total numbers and proportion of animals, by species, crossing the shipping and non-shipping channels we surveyed on the St. Mary's River from 15 January through 22 March 1980 (Table 9). Crossings by deer were the most common (52.3%) of the 1,144 calculated for

Table 9. Estimated Number of Crossings by Mammals on the St. Mary's River, 15 January to 22 March 1980. Calculations Assume that Crossing Rates on 47 Days Were Equal to Those Presented in Table 7, and Were Half Those Rates on the Other 21 Days. Percent of Row Total is Shown in Parentheses

| | Channel length (km) | Species | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Coyote | Red fox | Canid[a] | Dog | Deer | Unknown | Total |
| Shipping channel | 87.5 | 155 (13.5) | 55 (4.8) | 55 (4.8) | 40 (3.5) | 598 (52.3) | 241 (21.1) | 1,144 |
| Non-shipping channel | 55.3 | 70 (11.7) | 44 (7.3) | 258 (43.1) | 26 (4.3) | 102 (17.0) | 99 (16.5) | 599 |
| Total for all channels | 142.8 | 225 (12.9) | 99 (5.7) | 313 (18.0) | 66 (3.8) | 700 (40.2) | 340 (19.5) | 1,743 |

[a] Most likely coyote or red fox; possibly wolf, lynx or bobcat.

shipping channels. But on non-shipping channels, crossings by canids (coyotes, foxes, and unknown canids) comprised 62.1 per cent of the estimated total of 599.

Effects of Ship Passage

The U. S. Coast Guard icebreaker Katmai Bay traveled down the St. Mary's River from Sault Ste. Marie to Hay Point on 5 February, and to Johnson Point on 6 and 20 February. On 22 March, this vessel traveled south to Detour, and returned later in the day to Sault Ste. Marie with the larger icebreaker U.S.S. Mackinaw following. We conducted aerial surveys to locate tracks on the ice on 7 and 22 February, and 24 March. Ground surveys and observations were made on 5, 7, 8, and 22 February, and on 22, 23, 26, and 28 March.

Number of Turnbacks - Table 10 presents a summary of the activity of 89 animals which encountered the ship track within 48 hours after passages of icebreakers. All 37 deer encountering the ship track less than 24 hours after ship passage turned back; this includes three deer which fell into open water but escaped. An additional 2 of 4 deer turned back about 24 hours after ship passage. In contrast, none of 29 coyotes and foxes were deterred when encountering the ship track within 24 hours. Only 1 of 25 unidentified tracks turned back within 48 hours of ship passage.

Deer Behavior at Ship Track - Observations of both deer and their tracks (see Appendix A for detailed narratives) indicated that deer would sometimes travel over large (>5 $m^2$) flat plates of broken ice covered with snow that were less than 0.1-0.2 m from the nearest other plate, but turned back from the actual ship track which contained open water and floating, smooth chunks of ice less than 1.0 across. Tracks often led to within 10-20 m of the open ship track, then turned back. Some tracks led up to the very edge of the ship track, and several deer were observed sniffing at the open water. On most occasions, deer then moved 1-5 m back from the ship track edge, traveled along the track for 10-100 m, then attempted to cross again. This behavior was often repeated before the deer actually returned to shore. The three deer which fell into the ship track were observed on 22 March; 12 deer on the ice or at the shoreline were also observed on that day. On 23, 26, and 28 March, when ships were keeping the channel open continually, 13 hours of observations were made at Johnson Point. During that time, no deer were seen to travel on the ice, though 13 were seen on the Neebish shore on 28 March.

Weather after Passages - Mean daily temperature from 5 to 7 February was -12.8 C and the broken ice in the ship track likely froze quickly; the two deer noted in Table 10 which crossed at about 24 hours after ship passage did so on February 7. From 20 to 22 February, the mean daily temperature was only -1.7 C and the ice likely took somewhat longer to refreeze; however, 4 deer did cross the channel about 36 hours after ship passage at that time. Mean daily temperature from 22 to 24 March was -3.3 C, but as noted earlier, commercial shipping resumed on 24 March.

Other Turnbacks - The proportion of turnbacks by mammals during the rest of the winter was also noted. Of 313 sets of deer tracks located on the ice greater than 48 hours after ship passage, or on non-shipping channels, only 30 turned back. Apparent causes of turnbacks included: open water at East Neebish

Table 10. Proportion of Animals Which Turned Back Upon Encountering the Ship Track at Various Time Intervals After Passages of Icebreakers on 5, 6, and 22 February, and 22 March 1980, as Determined by Direct Observations of Animals and from Tracks (Proportion = Number of Animals Turning Back/Number of Animals Attempting to Cross)

| | Approximate number of hours since ship passage | | | | |
|---|---|---|---|---|---|
| Species | 3 | 12 | 24 | 36 | 48 |
| Deer | 18/18 | 19/19 | 2/4 | 0/4 | |
| Coyote | | 0/20 | 0/6 | | 0/1 |
| Red fox | | 0/2 | 0/1 | 0/1 | |
| Unknown | | | 0/3 | | 1/22 |

Channel (6 deer); slippery ice, especially new ice with little snow cover in late January (12 deer); and disturbance by passing automobiles on St. Joseph Island across from Johnson Point (6 deer). Six other deer turned back for undetermined reasons. The only coyote turnback of 111 tracks observed also occurred at the open water in East Neebish Channel. One of 39 fox tracks turned back after coming within 30 m of shore where dogs and occupied humans dwellings were present.

## Activity on the Ice

Species Comparison - The actual proportion of travel on the ice which resulted in crossings by individual species could not be determined because few of our survey flights covered shoreline areas, where tracks which did not cross channels were likely most common. Comparisons could be made, however, between the relative crossing activities of coyotes and deer. Twenty-three per cent of 111 coyote tracks on the ice departed and returned to the same shoreline without reaching the opposite shore. Only 0.7 per cent of 283 deer tracks on the ice (excluding the 30 deer noted above which turned back) returned to the same shoreline. A 2 x 2 contingency table was used to calculate a chi-square value testing the null hypothesis that there is no difference between crossing rates of deer (2 non-crossings and 281 crossings) and coyotes (25 non-crossings and 86 crossings). The $X^2$ value of 62.3 yields a probability of <.001 that there is no difference. Coyotes are therefore more likely than deer not to cross once they have ventured onto the ice. It appears that nearly all deer which go onto the ice do so with the purpose of crossing.

Of coyotes which did cross the ice, 27.4 per cent (n = 84) were considered to have moved either semi-directly (one or two obvious stops, or a change in direction of travel) or in a meandering fashion. Only 9.2 per cent (n = 281) of deer tracks were semi-direct or meandering, with the remainder classified as direct from one shore to the other. A similar 2 x 2 test was conducted comparing directness of movements of coyotes and deer. Differences between species were significant ($X^2$ = 13.2; P <.005).

Coyote Behavior - One seasonal difference was noted with respect to coyote activity on the ice. On three occasions (7, 17, and 22 February), we observed tracks on the ice near Johnson Point which were indicative of mating activities by coyotes. In each instance, pairs of animals had urinated, scratched, and meandered or "played" on the ice 200-300 m from shore.

## Observations of Deer

Location and Time of Activity Near Johnson Point - From 5 February through 18 March, between the hours of 1110 and 1600, 32 deer were observed on the ice near Johnson Point, 21 immediately north of the tip of the point and 11 south of the point. Eighteen of 29 deer north of the point were observed on the ice between 1154 and 1306 hours (the other one was at 1120 hr; mean = 1217 hr for 19 deer); observation time for two deer was not recorded. South of the point, 10 of 11 deer were observed between 1110 and 1125 hrs (the other one was at 1518 hr; mean = 1140 hr for 11 deer). Observation opportunities were equal for both areas. A t-test comparing means was conducted to test the hypothesis that there was no difference between the two areas in average time of day at which deer crossed. Differences in mean time were significant (t = 2.07, 28 d.f., P <.05) suggesting that deer crossed earlier in the day, south of Johnson Point. Unsuccessful crossing attempts were made repeatedly between 1030 and 1410 hrs, after the icebreaker had passed at 0945.

Proportion of Fawns Observed - At least 17 (29%) of the 58 deer observed near Johnson Point from 5 February to 28 March were fawns. Some of the 11 animals classified as unknowns may have also been fawns, but fawns were usually distinguished easily by their small body size.

Reactions to Other Disturbances - Deer on the ice were observed from the airplane on two occasions. Both times, deer were at least half way across the channel and looked up at the circling airplane. Passes within 150 m of the deer caused them to run to the shoreline away from the aircraft. The effects of automobiles traveling on St. Joseph Island shoreline directly across from Johnson Point was observed four times. On three occasions, deer stopped if they were crossing towards St. Joseph Island and then turned and ran back to Neebish Island when vehicles stopped or slowed down. One time, a deer leaving St. Joseph Island broke into a run and crossed to Neebish Island when a vehicle passed just behind it. On three occasions, snowmobiles traveled within 200 m of deer on the ice or at shoreline, and no change in the behavior of the deer was noted.

Deer Mortality - On 5 January, a deer carcass was observed from the air on a small bay where the Gogomain River enters Munuscong Lake. It was 150 m from shore, and though only ravens (*Corvus corax*) were present at the time, at least 5 sets of canid tracks were also observed. On 13 January, the U.S.S. Katmai Bay picked up a 39-kg male deer fawn, which had apparently slipped on the ice and was unable to return to shore, a distance of about 750 m to Hay Point. Despite attempts to revive the deer, it died the next day. On 21 January, the carcass of an immature female deer was found on Middle Neebish Channel near the east-west dike. Ravens and a bald eagle (*Haliaeetus leucocephalus*) were at the carcass, and tracks of at least one canid were noted. Deer tracks on the ice further down the channel indicated that footing on the ice for deer was very poor, and the dead animal probably fell and could not return to shore. And on 24 January, on a small bay south of Lime Island, tracks and large patches of hair were present where several coyotes had chased an adult female deer across the ice, about 50 m from shore at the furthest point, and attacked her at least three times. The deer was killed after traveling into the woods about 40 m. On 16 April the crew of the U.S.S. Katmai Bay observed a dead deer floating in the channel near Point Louise, just upstream from the narrows west of the International Bridge. Presumably this deer had fallen through poor ice and could not return to shore.

Deer Cover and Food on Neebish Island - On 18 April 1980, deer habitat was examined on Neebish Island, particularly shoreline habitat at Johnson Point. Table 11 lists 11 plant species which had been browsed. Although white cedar was abundant in the area, it had been heavily browsed in previous years and though it likely provided cover for wintering deer, little was newly browsed.

There was abundant evidence from droppings, runways and browsing that a large number of deer (perhaps 200-300) had wintered on the southern one-third of Neebish Island. Tracks observed during transect surveys in the woods on

Table 11. A List of Plant Species Browsed by Deer on Johnson Point as Noted During Habitat Investigation of Neebish Island, 18 April 1980

| Common name | Scientific name |
|---|---|
| White pine | *Pinus strobus* |
| Balsam fir | *Abies balsamea* |
| Balsam poplar | *Populus balsamifera* |
| Willow | *Salix* spp. |
| Tag alder | *Alnus rugosa* |
| Beaked hazel | *Cornus cornuta* |
| Rose | *Rosa* spp. |
| Staghorn sumac | *Rhus typhina* |
| Mountain maple | *Acer spicatum* |
| Red-osier dogwood | *Cornus stolonifera* |
| Honeysuckle | *Lonicera* spp. |

6 March also indicated a high deer concentration there. By 18 April, however, almost no fresh deer sign was observed on the southern half of the island, suggesting that most deer had already moved to other areas, probably off the island.

Observations of Other Species

Coyotes - Single coyotes were observed on the ice three times by other researchers in the area, on 10 and 13 February near Johnson Point (J. Duncan, pers. comm.) and on 21 February in northern West Neebish Channel (W. Duffy, pers. comm.).

Red Foxes - Foxes were observed on the ice on only two occasions. On 24 January, one individual was observed from the air just west of the International Bridge on the southwest shoreline of one of the dredged-material islands. On 29 January, R. Jensen (pers. comm.) watched two foxes on the ice at the northwest corner of Sugar Island, just north of the Sugar Island ferry causeway.

Dogs - Two dogs were observed on the ice, one on 26 January south of Lime Island near the Michigan mainland, and one on 7 March running along the ice shelf which paralleled the open water south of the Sugar Island Ferry. The first dog was within 200 m of parked snowmobiles, and the second was about 200 m from the nearest human habitation.

## Whitefish Bay

A total of five surveys was flown over parts of Whitefish Bay in attempts to locate mammal tracks (Table 12). At no time during the winter were conditions on the bay such that tracks would remain on snow covered ice greater than 200 m from shore for more than a day or two. Thus, our surveys concentrated on the islands in Whitefish Bay and along the Ontario shoreline (Figure 1).

Geographic Distribution of Tracks

Ile Parisienne (11.0 km from the nearest mainland) - Snowshoe hare (*Lepus americanus*) and red fox tracks were observed on all flights when tracks were detected. Both the shoreline and the island interior (flown north to south) were surveyed, and tracks of both species were common in all areas.

Maple Island (1.0 km from the mainland) - During the first of two surveys (8 March), tracks of a single canid crossing from the mainland to the island were noted. On the other survey (24 March), tracks of 2 to 3 deer were noted on the shoreline of the island.

North and South Sandy Islands (6.6 km from the mainland and 1.5 km from each other) - Red fox, snowshoe hare, and unidentified mustelid tracks were observed on the 28 February and 8 March surveys. Fox tracks were most common. On 24 March, a single set of canid tracks was noted on the south end of North Sandy Island and these continued southward onto the ice for 50 m before they were obscured. On South Sandy Island tracks of five different canids,

Table 12. Mammal Tracks Observed During Aerial Surveys of Shorelines of Islands and the Ontario Mainland of Whitefish Bay, January-March 1980

| *Location* | 31 January | 28 February | 8 March | 12 March | 24 March |
|---|---|---|---|---|---|
| Ile Parisienne | -----[a] | Red fox, snowshoe hare | Red fox, snowshoe hare | Red fox, snowshoe hare | no tracks |
| Maple Island | ----- | ----- | Canid[b] to island from mainland | ----- | Deer |
| N. and S. Sandy Islands | ----- | Red fox | Red fox, snowshoe hare, mustelid | ----- | Canid, wolf[c] |
| Batchawana Island | ----- | ----- | Canid across bays or out to smaller islands | ----- | ----- |
| Ontario mainland | Unknown | ----- | Canid, snowshoe hare, moose | ----- | ----- |

[a] Area not surveyed.

[b] Probably coyote, red fox, or wolf; possibly lynx.

[c] Tracks of 5 canids traveling together, probably wolf (see text).

apparently traveling together, were observed on the same flight. Snow had melted around these tracks, and they were likely about five days old. The tracks, however, could still be definitely identified as those of canids. They proceeded southward along the west side of the island within 10 m of shore. They left the island at the south end and continued in a south-southwesterly direction before they were lost in windblown snow and bare ice 80 m from shore. Drifted snow and rough ice prevented landing to more closely check the tracks, but we believe that the tracks were most probably made by wolves. It is unlikely that a pack of domestic dogs would venture so far out onto the bay, and coyotes or foxes rarely travel in packs as large as five animals. In addition, coyotes are much less common than wolves on the nearest Ontario mainland (unpubl. data, Ontario Ministry of Natural Resources, Sault Ste. Marie).

Batchawana Island (0.4 km from the mainland) - Canid tracks, likely those of coyotes or possibly single wolves, were observed on 8 March and crossed small bays on the island or went out to smaller adjacent islands 50-400 m away.

Ontario Mainland - Tracks of canids, snowshoe hares, and at least one moose were noted along the shoreline. Tracks were most common in areas where human dwellings were not present.

# PART V: DISCUSSION

## Winter Movements Across the Ice

### Canids

Review of Canid Movements - Coyotes travel across ice readily (Ozoga and Phillips 1964, Long 1978, Wright 1978, Van Druff and Lomolino 1979, W.Berg pers. comm., G.Smith pers. comm.), but are much more hesitant to swim any great distance (Bryant 1919, Couch 1932, Murie 1940, Robinson and Cummings 1947, Vermeer 1970). Up to 70 per cent of coyote juveniles ($\leq$ 1 yr old) disperse, usually during fall and early winter (Robinson and Cummings 1951, Knowlton 1972, Chesness and Bremicker 1974, Nellis and Keith 1976, Andrews and Boggess 1978, Berg and Chesness 1978). Red foxes are also generally disinclined to swim (Phillips et al. 1972, Sargeant 1972, Storm et al. 1976), but apparently cross ice without much hesitation (Crissey and Darrow 1949, Werner 1956, Storm et al. 1976, Pils and Martin 1978). Fox dispersal begins in late September and early October and continues through March; up to 88 per cent of pups and 30 per cent of adults may disperse (Phillips et al. 1972, Andrews et al. 1973, Storm et al. 1976, Pils and Martin 1978).

Tracks identified as unknown canid were likely those of coyotes and red foxes, but were possibly those of wolves, bobcats, or lynx also. Wolves are much more likely to cross ice than either lynx or bobcats (Mech 1966, McCord 1974, Peterson 1977, 1979, Allen 1979, Robinson and Fuller 1979, C.Brand pers. comm.). But because of their scarcity near the river (Robinson and Fuller 1979), any wolves or lynx that cross would likely be dispersing animals. Bobcats are more common near the river, but because of their preference for dense vegetation (McCord 1974), most crossings are likely to be done only by a few dispersers, also.

Winter Movements on the St. Mary's River - Activity of canids (coyotes, red foxes, and unidentified canids) observed by us was likely higher early in the winter than later for several reasons. The first ice cover made islands and opposite shorelines accessible. Coyotes and foxes with home ranges adjacent to the river may have crossed soon after freeze-up to explore newly accessible areas. Also, open river channels, which were barriers to some animals that may have been dispersing from their natal home range, became easily crossed routes in early winter.

Another reason for increased activity of canids on the ice is the timing of the breeding season. For coyotes and foxes, solitary individuals may more easily locate mates by traveling to new areas, or spending more time in open areas. Most coyote mating activity in the St. Mary's River area probably takes place from late January through February (Kennelly 1978); the same is true for foxes (Storm et al. 1976). Coyotes, foxes, and their tracks suggesting breeding activity were seen from 14 January to 22 February.

Canid activity on the ice may have been lower later in the winter because of changing snow depths. Track depths in snow on the ice in late February were deeper than on land and animals may have been more reluctant to travel across the ice. Frozen waterways are usually less covered with snow and are favored as traveling routes, but deep snow sometimes hampers coyote movements (Ozoga and Harger 1966). Track depths in snow in the woods in late winter were low, and presumably snow was not restrictive. Canid activity both on the ice and on land was low then, also, and animals may have needed to travel less in their search for food.

Canids did not apparently migrate, that is, cross channels in any one direction. Travel patterns on the ice indicated that canids utilized the ice more in search of prey or other members of their species, rather than to directly cross the channel, as deer did. More crossings of canids than of deer were at wide channels; one coyote traveled at least 9.0 km across one lake moving between islands but not setting foot on them. Canid crossings were spread throughout the river system, and were absent only where humans and dogs were habitually present. Most canids likely have little need to fear being caught by predators out on the ice, and therefore they appear to spend more time on ice than do deer.

Habitat use by canids was similar to that reported for coyotes by Ozoga and Harger (1966). Coyotes generally avoided upland hardwoods and used mixed or conifer forest more often. These habitats may be used more because prey animals in winter are more likely to be found there (Ozoga and Harger 1966).

Deer

Review of Winter Ecology - Near the Great Lakes, winter ranges of white-tailed deer are sometimes separated from summer ranges by distances up to 52 km (Verme 1973, Fanter 1977). Seasonal ranges and migratory patterns are apparently strongly traditional and learned early in life (Nelson 1979, Nelson and Mech 1980). Fall migrations of deer usually occur from late November through January (Westover 1971, Hoskinson and Mech 1976, Fanter 1977, Nelson and Mech 1980). Sharp drops in temperature, rather than just snowfall, apparently initiate migration activity (Verme and Ozoga 1971, Nelson and Mech 1980). Deer migrate to particular winter ranges, or "yards", to gain physical comfort and reduce physical environmental stress. Though proper food is essential for survival, deer apparently select yards more on the basis of shelter provided (Verme 1965) than on food available. In these areas, mature conifer cover ensures that snow is shallow and more dense, temperatures are more stable, and wind is less strong (Verme 1965, Ozoga 1968). In winters of deep snow, deer use smaller areas and travel less; they also utilize conifer cover more (Telfer 1970, Drolet 1976). Snow depths of 20 cm may influence the location of deer activity, and depths of 40 cm may severely restrict movements (Kelsall and Prescott 1971). Spring dispersal by deer is closely related to a rise in ambient temperature, usually when maximum daily temperatures become consistently above freezing (Drolet 1976, Nelson and Mech 1980); deep snow may impede dispersal in some years even when temperatures are higher. Spring dispersal usually takes place from March through April (Nelson and Mech 1980).

Deer may make extensive use of shoreline ice, but crossings are usually over rivers or lakes less than 1.6 km wide, and are usually direct (Jackson 1919, Peek pers. comm., W.Berg pers. comm.). In Upper Michigan, near Munising, deer commonly travel between Grand Island and the mainland (0.8 km), usually when snow on the ice is abundant and provides firm footing (L.Verme pers. comm.) Deer are vulnerable to predation by coyotes or wolves while traveling on ice (Pimlott et al. 1969, Mech 1970, J.Peek pers. comm.). Deer may also die after falling through thin or unsafe ice or after slipping and falling on smooth ice (Spiker 1933, Severinghaus and Cheatum 1956).

Winter movements on the St. Mary's River - Our data from winter 1979-80 indicate that deer migrations occurred through the first week of February. Ice and snow conditions for observing tracks were poor in January, and the ice surface condition for travel by deer was also poor. We believe that because of mild December and early January weather movements of deer to the Neebish Island yard in 1979-80 probably occurred later than in other winters. The yard on the southern half of Neebish Island was heavily used, and areas on St. Joseph Island across from Johnson Point are apparently a traditional extension of the yard that are used because of the presence of thick conifer cover and adequate food resources. The risk that deer take in crossing the open ice from Neebish to St. Joseph Island is likely compensated for by the quality of the available winter habitat on St. Joseph Island. In all areas, deer went directly across and did so only at narrow portions of the channel. Though snow cover may have influenced deer movements (mean depth = 25.9 cm), depths during the winter of 1979-80 were never such that they severely restricted travel. The proportion of fawns we observed near Johnson Point (29%) was similar to proportions found in other studies in northern Michigan (14-27%; Fanter 1977, W. Robinson et al. unpubl. data), and also suggested that winter weather was not overly detrimental to the deer population as a whole. Though crossing rates near Johnson Point were consistently high throughout the winter, our information suggests that crossings there may have been made by a relatively small number (perhaps less than 40) individual deer or groups of deer which crossed at particular locations at the same time during the day. It is possible, though, that a large proportion of the deer wintering on Neebish Island visit the Johnson Point at least once during the winter and may cross the channel.

## Potential Impact of Winter Shipping

### Anticipated Changes to Ice Cover

Although the few passages of the U. S. Coast Guard icebreaker Katmai Bay presented an opportunity to observe the impact of a ship passing through the channel in winter, it was a minimal look at best. Commercial vessel traffic with icebreaker assistance would alter the ice cover to a greater extent than that observed during the limited transits of the Katmai Bay. After multiple passages of commercial vessels and icebreakers, chunks of ice in the ship track may become smaller than those observed and this could affect mammal movement to a greater extent than observed during the 1979-80 winter.

Also, two proposed modifications to the navigation channel near Neebish Island would greatly affect ice cover. Because vessels encounter serious difficulty in negotiating sharp turns on some channels, air bubbler systems have been recommended to maintain thin ice cover in these areas (U. S. Army Corps of Engineers 1979a). Open water is sometimes present directly over the bubbler pipe, depending on temperature, and open water or thin ice may follow the ship track for up to 1,500 m, and up to 12 m on either side. In addition, an anticipated increase in winter traffic has created the need to consider two-way ship traffic around Neebish Island. The vessel track width could be doubled in some areas and the width of the broken ice field would be further extended.

## General Impact on Large Land Mammals

There are two primary obstructions to mammals attempting to cross recently created ship tracks in winter. Though all seven species of large land mammals may swim in summer (Robinson and Fuller 1979), none likely swim by choice in mid-winter, and thus all animals avoid open water present at ship tracks. Some animals may be able to swim on certain occasions, but deep water and floating ice chunks usually prevent easy and successful crossings or returns to shore. Also, the smooth floating ice chunks which are created after each ship passage refreeze and become extremely slippery. It is likely that the hesitancy of most large mammals to cross the ship track would increase in proportion to the area of the broken ice field over which they must travel. The degree to which open water and broken ice fields are present and their locations are likely to alter or possibly eliminate movements of mammals across the ice.

## Impact on Coyotes and Red Foxes

Our information indicates that coyotes and red foxes will cross newly made ship tracks soon after the ice is refrozen and will support their weight. The length of time required for the channel to refreeze, the frequency of ship passages, and the size of the ice field in the ship track all likely influence the rate at which coyotes and foxes cross the river in winter. Serious disruptions of coyote and fox movements are probably not common when temperatures are low and when ship traffic is light.

## Impact on White-tailed Deer

Deer have traditionally crossed parts of the St. Mary's River repeatedly while traveling between portions of their winter ranges (W. Daniher pers. comm.). Trappers and local residents have stated that more than 10 deer at a time were frequently seen crossing single file between Johnson Point and St. Joseph Island in years before winter shipping; well-used deer travelways were also obvious. The introduction of winter shipping has apparently impeded some of these crossings. Deer tracks were observed leading to and into the navigation channel in winter 1978-79 at the Johnson Point crossing area (U. S. Fish and Wildlife Service June 1979). Numerous trappers have commented on deer falling through thin ice and drowning, particularly at this crossing. One deer which fell through the ice but was able to return to shore was subsequently run down and killed by dogs (W. Daniher pers. comm.); normally, an unfatigued deer would have escaped. Dead deer have been found on shore both at the Johnson Point crossing area, and upriver from the International Bridge Near Point Aux Pins (T. Weise pers. comm., W. Daniher pers. comm.); in both these locations, deer have also been observed stranded on floating ice. Although cause and effect has not been conclusively demonstrated, some residents feel that deer are less numerous on St. Joseph Island since winter shipping began. Thus, it appears that in some areas in recent years, shipping may have created a formidable hazard to deer.

As a result of our studies, it has become apparent that deer cross the St. Mary's River only at a few specific locations. Channels near the south end of Sugar Island are crossed during migrations in early winter, whereas river segments near Johnson Point on Neebish Island are used all winter long. The channel there separates portions of an important winter yarding area, though the area utilized on St. Joseph Island is probably confined to the limited coniferous cover near the shoreline. Data collected immediately after passages of an icebreaker indicate that disturbances to ice cover greatly affect deer movements. Until ice cover refreezes, deer migrations and daily movements across channels are completely halted. In addition, deer sometimes fall into the open ship channel and some individuals may not be able to extricate themselves and return to shore.

The proposed modifications to the ship channel (the installation of air bubblers and two-way winter ship traffic) will likely cause an even greater impact on deer movements. Two proposed air bubblers near Johnson Point intercept major crossing routes of deer (Figure 14). It seems probable that deer movements would be deflected around the areas of open water and thin ice caused by the bubblers, or if the extent of ice disturbance is great enough, certain travel routes might be abandoned entirely. Two-way shipping will likely result in very wide areas of slippery, uneven ice cover, and this, too, may severely inhibit travel in certain areas.

The number of individuals within the deer population which cross the river in winter can not be determined at present. In the past, traditional routes have been maintained to some extent because winter shipping has not likely been severe enough to completely block movements or eliminate all those individuals which have learned to cross. We believe that the magnitude of crossings has diminished as a result of winter shipping, but the actual magnitude of change can not be determined.

If winter movements of deer are inhibited, delayed, or halted by winter shipping we can now only hypothesize as to the physical effect on each deer involved. Because winter yarding areas are selected for the benefits they provide during the harsh winter period, deer which are not permitted to reach these areas must winter in other, less favorable areas and probably suffer more physiologically. Deeper snow, colder temperatures and possibly poorer food will certainly result in a higher mortality rate of those individuals.

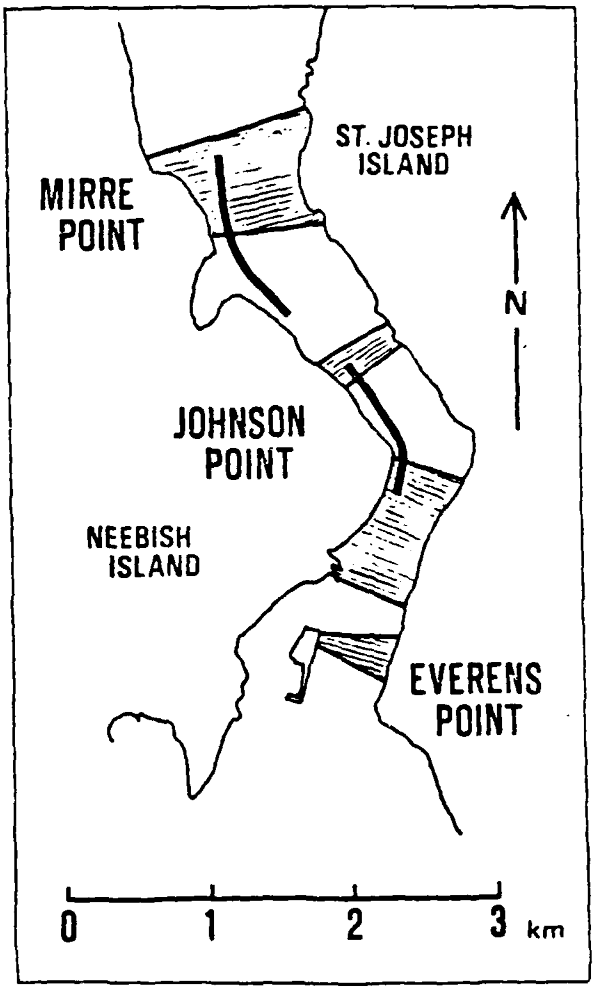


Figure 14. Locations of proposed air bubbler lines (solid lines) and major deer crossing areas in winter 1979-80 (shaded) near Mirre Point and Johnson Point on the St. Mary's River. Information on bubbler location from U.S. Army Corps of Engineers (1979).

Even the delay of some movements and repeated attempts to cross channels, may result in energy losses and stress which may affect the survival of many deer.

Impact on Wolves

The wolf is designated as an endangered species in the United States. Of major concern is the effect winter navigation might have on the immigration of wolves to Upper Michigan from Ontario (U. S. Army Corps of Engineers 1979b). Because of their large home range size and tendencies to travel widely (Robinson and Fuller 1979), wolf packs and lone wolves which occupy the area north of Sault Ste. Marie, Ontario undoubtedly travel to the eastern edge of Whitefish Bay. Our limited surveys of the area confirmed that a wolf pack likely traveled to islands at least 6.6 km from the Ontario mainland.

Review of Wolf Movements - In determining the potential impact of winter shipping, information on wolf travel on ice needs to be considered. The information most relevant to our objectives has come from observations of wolves on ice near Isle Royale, Michigan, in Lake Superior. On the nearby Sibley Peninsula, DeVos (1950) reported that wolves traveled extensively along the lake shoreline and long crossings to nearby islands and the adjacent mainland took place in a straight line between the nearest points of land. He also cited reports of wolves seen on the ice half way to Isle Royale, 24 km distant. It is believed that the pack of wolves which recolonized Isle Royale in the late 1940's crossed over a solid ice bridge from the Sibley Peninsula (Mech 1966, Allen 1979). Wolves on Isle Royale have been continuously studied since 1959 (Mech 1966, Jordan et al. 1967, Wolfe and Allen 1973, Peterson 1977, Allen 1979) and though no packs have been directly observed traveling between the island and the mainland, it is reported likely to have happened at least 3 times. Peterson (1979) reported that a subordinate female wolf was chased twice by 3 other pack members, first at least 16.8 km across the ice toward Ontario (and likely all the way to the nearest islands) and then 4 days later 5.6 km out on the ice.

Wolves on Isle Royale routinely cross Siskiwit Bay in winter, which is up to 8 km across (Mech 1966, R.Peterson pers. comm.). Wolves commonly travel shoreline ice (Peterson 1977) and in winters when there are expanses of smooth ice around the island, wolves will range up to 8 km from shore (R.Peterson pers. comm.). Mech (1966:93) observed a pack heading out across the ice, initially across chunks near shore frozen together by new ice. Animals were cautious about crossing from one type of ice to another and most of the wolves were reluctant to proceed. After encountering ice "composed of many small sharp pieces frozen together", they returned to the island, 5.3 km distant. Peterson (1977, pers. comm.) observed that wolves used smooth, snow-covered ice readily, even if it was very thin, but avoided pressure ridges, especially at the southwest end of the island where water currents pushed ice up 0.4 km from shore. It seems likely that the further from shore wolves travel, the more reluctant they become to travel over rough ice (L.D. Mech pers. comm.). Wolves apparently travel on ice regularly although a disrupted surface may cause them to hesitate or retreat.

Potential for Wolf Immigration to Michigan - It is apparent that Upper Michigan is within range of wolves dispersing from Ontario. Mech (1966:91) summarized the conditions necessary for immigration of wolves to Isle Royale, and thus factors likely applying to crossings of Whitefish Bay, as follows: (1) a high wolf population or food shortage in the emigration area, causing "pressure" for animals to seek a new area, (2) a solid snow-covered "ice bridge", (3) a positive reception given newcomers by residents (both wolf and human in Michigan), and (4) an adequate population of prey to sustain immigrants. It should be added that wolves which become accustomed to traveling on ice (between islands, peninsulas and mainland) would be least hesitant to cross Whitefish Bay (L.D. Mech pers. comm.). In addition, it is probably important that such exploring wolves be able to see the land at Whitefish Point. On an overcast day in March 1980, we confirmed that the Point could be seen from a wolf's vantage point. At some time during each winter, Whitefish Bay freezes over, thus a travel route is present which wolves apparently have the ability to cross (17-26 km). Conflict between immigrating wolves and resident wolves would likely be very low; more important is the potential human-caused mortality. Prey densities appear adequate to support a population (Hendrickson et al. 1975, Weise et al. 1975). Wolf and prey densities on the Ontario side of the bay are currently unknown, however. That large numbers of wolves have not immigrated to Michigan from Ontario indicates that the necessary combination of circumstances does not occur often. Wolves might also immigrate to Michigan by crossing the St. Mary's River, but to do so they must travel through somewhat settled areas.

Impact of Winter Shipping on Wolves - Winter shipping, and the resulting changes in ice cover, might limit wolf dispersal to Upper Michigan, though no quantitative data are available. Presumably, abrupt changes in ice conformation, that is floating or frozen chunks or ice heaves on shipping channel edges long distances from shore, might cause wolves crossing the ice to turn back. Additional information concerning both winter shipping effects, and the density, distribution, and activities of wolves and their prey on Ontario seem necessary.

## Impact on Lynx, Bobcats, and Moose

No quantitative information on movements of lynx or moose was collected during our studies; bobcat tracks were encountered crossing the St. Mary's River only once, on Middle Neebish Channel. Lynx are very rare in the Upper Peninsula of Michigan (Robinson and Fuller 1979) and reestablishment of a viable population there will likely be the result of immigration from Ontario. Crossings during summer are probably very rate. Ice crossings by resident lynx are also probably low, and thus most crossings of the river in winter would be by dispersing animals. The greatest number of dispersing lynx will probably occur in the years immediately after a crash in snowshoe hare numbers which occurs about every 10 years (Adams 1963, Keith 1963, Mech 1973, 1980, Gunderson 1978). Resident trappers in Ontario have noted that hare numbers have been high in recent years, and thus the impending crash in hare numbers and the subsequent dispersal of lynx is likely to occur in the next several years. Certainly open water in shipping channels may inhibit channel crossings by lynx, though smooth ice may have only a minor effect.

Use of the St. Mary's River by bobcats is probably low, due to their preference for dense vegetation (McCord 1974). However, it would seem that some bobcats are likely to disperse into Ontario and, as with lynx, any hindrance of dispersal due to winter shipping could reduce the chances of maintaining a viable population in Ontario.

Moose crossings of the St. Mary's River from Ontario, where moose are common, to Upper Michigan, where few are present, likely take place a few times a year. Most crossings probably occur by swimming during the ice-free seasons, but a number undoubtedly occur in winter, also (Robinson and Fuller 1979). Since moose are susceptible to falling through thin or unsafe ice and drowning (Peterson 1955, Peterson 1977, Allen 1979, Mytton and Keith 1979), winter shipping may pose a deterrent to successful moose immigration to Michigan. No moose, however, were observed crossing during the winter of 1979-80.

## Consideration of Baseline Data

One of the stated objectives of our study was to gather baseline data on movements of mammals across the ice of eastern Lake Superior and the St. Mary's River. An important concern in this regard is whether or not conditions during the winter of 1979-80 could be considered normal or "baseline" with respect to animal movements.

A notable difference in weather during the winter of 1979-80 was much lower than normal mean daily snow depth. Mean depths in January and February (23.9 cm) were 58 per cent of other years (40.9 cm). Also, ice formation on the river, with the accompanying snowfall to permit easier crossings by mammals, apparently occurred later than usual in winter 1979-80. These factors likely had an influence on both the timing and magnitude of movements by large land mammals, particularly deer, for which winter weather plays an important role in regulating migrations.

We noted earlier that during part or all of the winters of 1971-72 through 1978-79, the St. Mary's River and Whitefish Bay were open to winter navigation, and that shipping this past winter continued until 15 January. That winter shipping probably affects movements of deer, and possibly those of some other species, seems quite evident from our data. Deer mortality associated with a newly constructed highway through a Michigan deer yard (Reilly and Green 1974) was highest in the first winter of use, declining somewhat thereafter, but remaining higher than pre-highway mortality. It is our opinion that the major disruption of deer movements and the highest mortality due directly to winter shipping occurred during the early years of winter shipping on the St. Mary's River, although no studies were conducted during those years. The impact of shipping may have decreased somewhat over succeeding years, but as with highway mortality, the effect probably continued each winter. Deer populations may have declined as a result. Migrations by some deer were likely either delayed or thwarted completely by winter shipping. In both instances, excessive winter stress may have occurred as a result of suboptimal food or shelter available to the deer. Disruptions in daily movements across the river may also have kept deer from acquiring food or shelter in some optimal habitats, and concentrated more animals on a restricted winter range. Deer mortality due to drownings has undoubtedly occurred each winter, as shipping does not seem to have totally extinguished traditional movement patterns.

In light of these speculations, our data from winter 1979-80 were likely influenced by mild weather, and more importantly by shipping activity in preceding winters. They therefore do not necessarily reflect normal or "baseline" conditions. Certainly the curtailment of shipping in the winter of 1979-80 allowed some traditional movement patterns to become better reestablished. But neither the magnitude of these movements in pre-shipping winters, nor the impact of initial winter shipping in the first several years can be estimated. If representative data on mammal movements on the ice in the absence of shipping are to be obtained, it will be necessary to discontinue winter shipping entirely for a number of consecutive years and monitor mammal movement patterns during that time. A return to the shipping dates of 1 April to 15 December as were traditional until 1970 would permit collection of mammal movements approximately as existed during that time.

## Further Information Needed

### General

Our studies conducted during the winter of 1979-80 should be supplemented by additional information. Since this was the first winter since 1970-71 in which no shipping was carried out between 15 January and late March, animals may not have adjusted their behavior to the comparatively solid ice conditions. At least two more consecutive winters should be devoted to gathering basic data on numbers and species of animals crossing and on locations and seasonal patterns of such activity. Also, information gathered in normal and severe winters would be helpful.

### Deer Movements and Activity Near Neebish Island

Winter deer cover and food are apparently available on the southern third of Neebish Island, with some also available on St. Joseph Island. Information on the number of deer present and the number crossing the ice should be obtained in order to assess potential impact of winter shipping. The abundance of tracks crossing the channel may have resulted from a few deer crossing frequently or many deer crossing a few times each. In order to learn the numbers involved it would be necessary to mark a portion of the population and observe them. Under the existing conditions, live trapping and collaring with visible plastic numbered collars would probably be the most feasible way of doing this. In addition, by fitting about a dozen deer with radio-transmitting collars, movements of individual animals could be monitored to determine frequency of crossing channels, size of winter range, and location of summer home range. Nocturnal as well as daytime movements could be monitored by radio telemetry.

### Deer Behavior in Water

Some observers reported to us that a deer which falls through the ice into deep water will drown. We watched three deer fall into water amid broken ice and escape within a few minutes. It is possible that the size of ice chunks could determine whether a deer is able to extricate itself from the water or not. Larger chunks that can support the weight of a deer may favor escape and small chunks may hamper it. Additional observations under field conditions could most easily be made near Johnson Point, where we were able to observe a large number of deer on the ice.

## Wolf Densities in Ontario

Although the presence of wolves north of Sault Ste. Marie is verified by trapper success, the Ontario Ministry of Natural Resources was unable to provide us with an estimate of their density. Knowledge of wolf densities is necessary to estimate the probability of wolves dispersing across Whitefish Bay to Michigan. The distance between Batchawana Point in Ontario and Whitefish Point in Michigan (26 km) is similar to the distance from the Sibley Peninsula to Isle Royale, a distance across which wolves are known to cross about once every 5-7 years. If the density of wolves in the Batchawana Bay area is similar to that of the Sibley Peninsula and their prey availability is similar, we might expect a similar rate of dispersal. Without such information, however, it is extremely difficult to guess the likelihood of wolves crossing Whitefish Bay. Tracking conditions on the Bay are unfavorable most of the time during the winter. Radio-tagging some wolves whose home ranges touch the shoreline would also yield information on how frequently the wolves travel out onto the ice and how far they go. Two or three winters of study would be required.

## Recommendations for Reducing or Eliminating the Impact of Winter Shipping on Mammal Movements

The most effective way to eliminate the impact of winter shipping on mammal movements across the ice is to eliminate winter shipping. If the decision is made, however, to proceed with winter shipping a number of mitigating measures are tentatively recommended on the basis of our studies during the winter of 1979-80. These recommendations are as follows:

(1) Conduct shipping only during the period from 10 February-10 March. The bulk of mammal movements across the ice occurred in late January, early February, and late March. In early winter deer were apparently migrating to their winter yard on Neebish Island and depended upon an ice bridge to cross from Sugar Island and the Canadian shore. Shipping only during February and early March would also permit rapid refreezing of the channel because of cold air and water temperatures at that time so that the disruption to mammal movements following passage of a ship would be less than 36 hours.

(2) Concentrate ship movements in time. Grouping ship passages into two days per week would permit refreezing of the channel and allow mammal passages. Such an approach, however, assumes that the animals can adapt to crossing at our convenience rather than at theirs, and it is possible that they might not learn the appropriate schedule.

(3) Keep water open at key crossing points. Clearly open water, that is water without floating ice, represents an unambiguous barrier to animals attempting to cross. According to our observations, deer turn back before reaching open water and do not fall through and drown such as can apparently occur when small ice chunks are present on the surface of the water. Thus, keeping water open by use of bubblers in the Middle Neebish and Munuscong Channels near Mirre and Johnson Points might prevent direct mortality of deer. The drawback of such an approach, however, is that obviously the deer and other mammals would be prevented from crossing the channel to reach the resources they are seeking, resources which could be important for their general welfare and survival. A further incentive which might cause deer to avoid particularly treacherous crossing points, such as stretches near bubblers, would be to establish coniferous tree growth on shorelines in less hazardous areas. Such conifer stands apparently serve to funnel deer movements as the animals seek concealment upon entering and leaving the ice. The basic problem of crossing the ship track remains, however.

(4) Provision of food and cover resoources where movements are disrupted. If animals are prevented by ships from crossing the ice a potential solution would be to provide the resources they seek in locations which would eliminate the necessity for them to cross the ice to obtain such resources. The two resources needed by wintering deer are food and cover. These can be provided in suitable areas by proper forest management which involves clear cutting mature conifer stands in small units on a rotating basis so that patches of young growth providing food are interspersed among mature stands which provide winter shelter (Verme 1965). Such an approach, however, assumes the availability of suitable stands and the cooperation of land-owners. In addition many animals tend to explore new areas and young animals disperse into new terrain, regardless of available food and shelter in their home range, and such animals would likely attempt to cross the ice. A successful winter yard management project on one side of the river and an unsuccessful one on the other could serve as an attraction to deer and actually increase their traffic across the river.

(5) Ship only in the West Neebish Channel during winter. All crossings of deer in the Neebish Island area took place in channels other than the West Neebish Channel. Only 56 coyotes, foxes, and unknown canids were estimated to have crossed the West Neebish Channel and these animals are able to cross quite readily after ship passage. Use of this channel instead of Middle Neebish and Munuscong Channels would considerably reduce the impact of shipping on mammal movements. The main drawback of such a measure, however, is that the human population of Neebish Island has become dependent upon an ice bridge across the channel for snowmobile and foot travel to and from the mainland at Barbeau. Maintenance of winter ferry service such as at Sugar Island is a possible solution to that problem.

(6) Transport animals across the ice. The approach of trapping and carrying animals across the shipping channel is probably financially and practically unfeasible in the case of most mammals in the study area. With species that are relatively rare, however, and for which crossings may be in the nature of dispersal rather than merely local movements, such an approach should not be totally dismissed. Three species in particular, moose, lynx, and wolf, are

relatively common on the Canadian side of the study area and uncommon or rare on the U. S. side. If shipping disrupts the potential for dispersal into the U. S. of a few animals per year or per decade some simulation of normal dispersal of these species might be attempted as a mitigating procedure. The drawback of such an approach is, however, that little is known about which individual animals are most likely to permanently and successfully disperse from their natal area. All members of a population are not equally prepared to depart from their family and familiar surroundings and to settle into a new home range. If the approach of simulating dispersal is adopted, care should be taken to displace animals which would be likely to disperse on their own. Present knowledge is only that such animals are generally just attaining sexual maturity. Little is known about the influence of their social status or of food resources in their natal range.

## Suggestions for Monitoring Mammal Crossings

If winter navigation is approved we recommend the following methods of monitoring the movements of mammals across the ice:

(1) Flights should be made as often as weather permits. The unpredictability of weather in the study area makes it difficult to schedule flights in advance. Monitoring personnel should therefore plan to spend the winter at the study area rather than attempting to spend one week per month or two days per week doing aerial track surveys.

(2) The most suitable method is to use a high-wing slow-flying aircraft at an altitude of 45-75 m above the ice, with two observers plus pilot, each observer looking out of different sides of the airplane. Clear skies with wind less than 12 km/hr are the most desirable conditions. Details are presented in paragraphs 16-17 of this report.

(3) Tracks observed from the air should be verified from the ground, particularly during the early stages of monitoring, as the personnel are gaining experience.

(4) Data to be collected on both aerial and ground surveys should include: species; date; time; location of starting and ending points of track; number of animals in the group; whether the animals were seen; estimated age of track; direction of travel; whether the track crossed the channel; whether movement was direct, indirect, or meandering; width of channel, distance animal traveled on ice; depth animal sinks into snow on land and on ice; time since last snowfall or strong wind; ice and snow conditions; habitat type on land at starting and ending points of track; and time since ship passage.

(5) Transects in locations inland from the channel should be established and track surveys conducted. These would serve as a basis for comparison to determine whether a decline or increase in animal activity on the ice is accompanied by a corresponding decline of activity on land.

(6) A possible automatic monitoring system for areas of frequent animal crossings might be experimented with and developed. Such a system might consist of an infra-red camera with automatic advance (or preferably a motion picture camera with infra-red film set at time lapse speed of about 1 frame per minute). Animals moving across the ice would be detected and recorded on a 24-hour a day basis.

(7) In addition deer crossing at Johnson Point should be observed directly. In February and March deer can be seen crossing the channel between 1000 and 1500 hrs. Information on their response to ships and ship channels and on their fate upon falling into the channel should be recorded.

## PART VI: CONCLUSIONS

(1) During the 15 January-22 March period, 554 sets of tracks were observed crossing the channels of the St. Mary's River under suitable tracking conditions. Of these 281 (51%) were of deer, 84 (15%) were of coyote, 34 (6%) of foxes, 25 (5%) were of domestic dogs, 39 (7%) were of unidentified canids, and 85 (15%) were unidentified mammals. Only one bobcat track and no lynx, wolf, or moose tracks were located on the St. Mary's River.

(2) Adjusting for days in which weather conditions were not suitable for recording tracks we estimated a total of 1743 animals crossing river channels, of which 1144 crossed shipping channels and 599 crossed channels not traversed by ships in the winter.

(3) Coyotes and foxes were most active in January and early February. Deer were most active in January, early February and late March.

(4) Ninety per cent of crossings recorded were on channels adjacent to Neebish Island.

(5) On two channels, Middle Neebish and East Neebish, near Stribling Point, the directional pattern and timing of movements indicated migration of deer in late January and early February toward Neebish Island. At Mirre Point and Johnson Point deer movements across the channel were frequent throughout the winter and in both directions, indicating use of resources on both sides on a regular basis.

(6) Coyotes, foxes, and especially deer, crossed narrow channels significantly more frequently than wide channels.

(7) After passages of a small U. S. Coast Guard icebreaker, 27 coyotes and four foxes were found to have little trouble crossing the partially frozen or freshly refrozen ship track, while 37 deer were all obstructed from crossing within 24 hours and 2 of 4 were prevented from crossing from 24 to 36 hours after ship passage.

(8) Coyotes and foxes tended to cross channels indirectly or meander on the ice while deer crossed in a direct route.

(9) Frequent high winds, snow, and variable ice conditions on Whitefish Bay combined to make quantitative track surveys there difficult.

(10) Near the islands of Whitefish Bay tracks of foxes, deer, and wolf were identified.

(11) The partially obliterated tracks of a pack of five wolves were observed near South Sandy Island, 6.6 km from the Ontario mainland and 17 km from the ship track near Whitefish Point.

(12) A preliminary assessment of the impact of winter shipping on mammal movements suggests that the effects are adverse on deer, impeding seasonal migration and daily movements and causing direct mortality; are completely known but probably hindering the dispersal of wolves, bobcat, lynx, and moose; and are slight on coyotes and foxes.

(13) Mitigating measures suggested include cessation of winter shipping, grouping ships to permit refreezing of the ship track, conducting shipping only between 10 February and 10 March, shipping only in West Neebish Channel, and simulating dispersal by transporting members of rare species across the channel.

(14) Because of the possibly lingering impact of winter demonstration shipping between 1971 and 1979, shipping should be discontinued for at least three consecutive winters to permit the system to readjust and so that base-line data gathered on mammal movements on the ice may be more representative of non-shipping conditions.

(15) Further information is specifically needed on deer movements and behavior at Neebish Island to determine the number of deer crossing the channel and on wolf densities and behavior along the Ontario shoreline of Whitefish Bay.

# REFERENCES


Adams, A. W. 1963. The lynx explosion. North Dakota Outdoors 26:20-24.

Allen, D. L. 1979. Wolves of Minong - Their vital role in a wild community. Houghton Mifflin Co., Boston. 499pp.

Andrews, R. D., and E. K. Bogess. 1978. Ecology of coyotes in Iowa. Pp. 249-265, in Coyotes: Biology, behavior and management (M. Bekoff, ed.) Academic Press, New York. 384pp.

Andrews, R. D., G. L. Storm, R. L. Phillips, and R. A. Bishop. 1973. Survival and movements of transplanted and adopted red fox pups. J. Wildl. Manage. 37:69-72.

Banfield, A. W. F. 1954. The role of ice in the distribution of mammals. J. Mammalogy 35:104-107

Bellis, E. D., and H. B. Graves. 1971. Deer mortality on a Pennsylvania interstate highway. J. Wildl. Manage. 35(2):232-237.

Berg, W. E., and F. A. Chesness. 1978. Ecology of coyotes in northern Minnesota. Pp. 229-247, in Coyotes: Biology, behavior and management (M. Bekoff, ed.) Academic Press, New York, 384 pp.

Bergman, G. 1966. Occurrence and living habits of the fox (*Vulpes vulpes*) in Finnish island areas, and its effect on birds. Suomen Riista 18:30-41. (English Summary).

Bryant, H. C. 1919. The coyote not afraid of water. J. Mammal. 1:87-88.

Chesness, R. A., and T. P. Bremicker. 1974. Home range, territoriality, and sociability of cyotes in northcentral Minnesota. Paper presented, Coyote Research Workshop, Denver.

Couch, L. K. 1932. River swimming coyotes. Murrelet 13:24-25.

Crissey, W. F. and R. W. Darrow. 1949. A study of predator control on Valcour Island. New York State Conservation Dept., Division of Fish and Game, Research Series, No. 1. 28 pp.

Curtis, J. T. 1959. The vegetation of Wisconsin - An ordination of plant communities. Univ. Wisconsin Press, Madison. 657 pp.

DeVos, A. 1950. Timber wolf movements on Sibley Peninsula, Ontario. J. Mammal. 31:169-175.

Drolet, C. A. 1976. Distribution and movements of white-tailed deer in southern New Brunswick in relation to environmental factors. Can. Field Nat. 90:123-136.

Fanter, L. H. 1977. A study of populations and behavior of white-tailed deer in Beaver Basin, Michigan. M.S. Thesis, Northern Mich. Univ., Marquette. 102 pp.

Gunderson, H. L. 1978. A mid-continent irruption of Canada lynx, 1962-63. Prarie Nat. 10:71-80.

Hatt, R. T., J. VanTywe, L. C. Stuart, C. H. Pope, and A. B. Grobman. 1948. Island life: A study of the land vertebrates of the islands of eastern Lake Michigan. Cranbrook Inst. of Sci. Bull. No. 27, 179 pp. Cranbrook Press, Bloomfield Hills, Michigan.

Hendrickson, J., W. L. Robinson, and L. D. Mech. 1975. The status of the wolf in Michigan. Amer. Midl. Nat. 94:226-232.

Hoskinson, R. L., and L. D. Mech. 1976. White-tailed deer migration and its role in wolf predation. J. Wildl. Manage. 40:429-441.

Jackson, H. H. T. 1919. An apparent effect of winter inactivity upon distribution of mammals. J. Mammal. 1:58-64.

Jordan, P. A., P. C. Shelton, and D. L. Allen. 1967. Numbers, turnover and social structure of the Isle Royale wolf population. Amer. Zool. 7:233-252.

Keith, L. B. 1963. Wildlife's ten-year cycle. Univ. Wisconsin Press, Madison. 201 pp.

Kelsall, J. P., and W. Prescott. 1971. Moose and deer behaviour in snow in Fundy National Park, New Brunswick. Can. Wildl. Serv. Rep. Ser. No. 15. 25 pp.

Kennelly, J. J. 1978. Coyote Reproduction. Pp 73-93, in Coyotes: Biology, behavior and management (M. Bekoff, ed.) Academic Press, New York. 384 pp.

Klein, D. R. 1971. Reaction of reindeer to obstructions and disturbances. Science 173:393-398.

Klein, D. R. 1979a. The Alaska Pipeline in retrospect. Trans. N. Am. Wildl. Nat. Resources Conf. 44:235-246.

Klein, D. R. 1979b. Reaction of caribou and reindeer to obstructions - A reassessment. Proc. Second Intl. Reindeer/Caribou Symp. Røvos, Norway. In Press.

Knowlton, F. F. 1972. Preliminary interpretations of coyote population mechanics with some management implications. J. Wildl. Manage. 36:369-382.

Long, C. A. 1978. Mammals of the Islands of Green Bay, Lake Michigan. Jack-Pine Warbler 56:59-82.

Maycock, P. F., and J. T. Curtis. 1960. The phytosociology of boreal conifer-hardwood forests of the Great Lakes Region. Ecol. Monogr. 30(1):1-35.

McCord, C. M. 1974. Selection of winter habitat by bobcats (Lynx rufus) on the Quabbin Reservation, Massachusetts. J. Mammal. 55:428-437.

Mech, L. D. 1966. The wolves of Isle Royale. U. S. Natl. Park Serv., Fauna Ser. No. 7:1-210.

Mech, L. D. 1970. The wolf: The ecology and behavior of an endangered species. Doubleday, New York, N.Y. 384 pp.

Mech, L. D. 1973. Canada lynx invasion of Minnesota. Biol. Cons. 5:151-152.

Mech, L. D. 1980. Age, sex, reproduction, and spatial organization of lynxes colonizing northeastern Minnesota. J. Mammal. 61(2):261-267.

Miller, F. L., and A. Gunn. 1978. Inter-island movements of Peary Caribou south of Viscount Melville Sound, Northwest Territories. Can. Field-Nat. 92:327-333.

Murie, A. 1940. Ecology of the coyote in Yellowstone. U. S. Natl. Park Serv., Fauna Ser. 4:1-206.

Murie, O. J. 1954. A field guide to animal tracks. Houghton Mifflin Co., Boston. 376 pp.

Mytton, W. R., and L. B. Keith. 1979. Dynamics of moose populations near Rochester, Alberta, 1975-79. Dept. Wildl. Ecol., Univ. Wisc., Madison. 49 pp.

Nellis, C. H., and L. B. Keith. 1976. Population dynamics of coyotes in central Alberta, 1964-68. J. Wildl. Manage. 40:389-399.

Nelson, M. E. 1979. Home range location of white-tailed deer. U. S. Dept. Agric. For. Serv., Res. Pap. NC-173. 10 pp. North Centr. For. Exp. Stat., St. Paul, Minn.

Nelson, M. E., and L. D. Mech. 1980. Deer social organization and wolf predation in northeastern Minnesota. Wildl. Monogr. In Press.

Ozoga, J. J. 1968. Variations in microclimate in a conifer swamp deeryard in northern Michigan. J. Wildl. Manage. 32:574-585.

Ozoga, J. J., and E. M. Harger. 1966. Winter activities and feeding habits of northern Michigan coyotes. J. Wildl. Manage. 30:809-818.

Ozoga, J. J., and C. J. Phillips. 1964. Mammals of Beaver Island, Michigan. Mus., Mich. St. Univ., Biol. Ser. 2(6):305-348.

Peterson, R. L. 1955. North American moose. Univ. Toronto Press. 280 pp.

Peterson, R. O. 1977. Wolf ecology and prey relationships of Isle Royale. U. S. Natl. Park Serv. Sci. Monogr. 11:1-210.

Peterson, R. O. 1979. Social rejection following mating of a subordinate wolf. J. Mammal. 60:219-221.

Phillips, R. L., R. D. Andrews, G. L. Storm, and R. A. Bishop. 1972. Dispersal and mortality of red foxes. J. Wildl. Manage. 36:237-248.

Pils, C. M., and M. A. Martin. 1978. Population dynamics, predator-prey relationships and management of the red fox in Wisconsin. Wisc. Dept. Nat. Res., Tech. Bull. No. 105. 56 pp.

Pimlott, D. H., J. A. Shannon, and G. B. Kolenosky. 1969. The ecology of the timber wolf in Algonquin Park. Ontario Dept. Lands and For: Res Rep. (Wildl.) 87:1-92.

Puglisi, M. J., J. S. Lindzey, and E. D. Bellis. Factors associated with highway mortality of white-tailed deer. J. Wildl. Manage. 38(4):799-807

Reilly, R. E., and H. E. Green. 1974. Deer mortality on a Michigan interstate highway. J. Wildl. Manage. 38(1):16-19.

Robinson, W. B., and M. W. Cummings. 1947. Notes on behavior of coyotes. J. Mammal. 28:63-65.

Robinson, W. B., and M. W. Cummings. 1951. Movements of coyotes from and to Yellowstone National Park. Spec. Sci. Rep. Wildl. No. 11, USDI. 17 pp.

Robinson, W. L., and T. K. Fuller. 1979. Literature and information search concerning potential effects of icebreaking activities associated with Great Lakes-St. Lawrence Seaway extended winter navigation on movement of large land mammals in the eastern Lake Superior and St. Mary's River area. Dept. Biology, Northern Mich. Univ., Marquette. Typewritten. 66 pp.

Sargeant, A. B. 1972. Red fox spatial characteristics in relation to waterfowl predation. J. Wildl. Manage. 36:225-236.

Severinghaus, C. W., and E. L. Cheatum. 1956. Life and times of the white-tailed deer. Pp. 57-186 in W. P. Taylor (ed.) The deer of North America. Stackpole Co., Harrisburg, Pennsylvania. 668 pp.

Stinger, F. J. 1978. Behavior of mountin goats in relation to U. S. Highway 2, Glacier National Park, Montana. J. Wildl. Manage. 42(3):591-597.

Spiker, C. J. 1933. Some late winter and early spring observations on the white-tailed deer of the Adirondacks. Roosevelt Wildl. Bull. 6(2):327-385.

Storm, G. L., R. D. Andrews, R. L. Phillips, R. A. Bishop, D. B. Siniff, and J. R. Tester. 1976. Morphology, reproduction, dispersal, and mortality of midwestern red fox populations. Wildl. Monogr. No. 49, 82 pp.

Telfer, E. S. 1970. Winter habitat selection by moose and white-tailed deer. J. Wildl. Manage. 34(3):553-559.

U. S. Army Corps of Engineers. 1979a. Final survey study for Great Lakes and St. Lawrence Seaway navigation extension. Vol. 2, Appendix B, 343 pp.

U. S. Army Corps of Engineers. 1979b. Final supplement to the final environmental statement - operations, maintenance, and minor improvements of the federal facilities at Sault Ste. Marie, Michigan addressing limited season operation extension. U. S. Army Engineer District, Detroit.

U. S. Fish and Wildlife Service. June, 1979. Letter report to the Detroit District, Corps of Engineers, concerning fiscal year 1979 navigation season extension demonstration.

VanDruff, L. W., and M. V. Lomolino. 1979. Environmental assessment of the FY 1979 winter navigation demonstration of the St. Lawrence River - Technical Report M, mammal and furbearer studies during the winter of 1978. St. Univ. Coll. of Envir. Sci. and For., Inst. of Envir. Prog. Aff., Syracuse, N.Y. 35 pp.

Verme, L. J. 1965. Swamp conifer deeryards in northern Michigan. J. Forestry 63(7):523-529.

Verme, L. J. 1973. Movements of white-tailed deer in upper Michigan. J. Wildl. Manage. 37:545-552.

Verme, L. J., and J. J. Ozoga. 1971. Influence of winter weather on white-tailed deer in upper Michigan <u>in</u> Proc. snow and ice symp., (A. O. Haugen, ed.) Iowa Coop. Wildl. Res. Unit, Iowa St. Univ., Ames. 280 pp.

Vermeer, K. 1970. A study of Canada geese, *Branta canadensis*, nesting on islands in southeastern Alberta. Can. J. Zool. 48:235-240.

Villmo, L. 1975. The scandinavian viewpoint - panel on potential impact of accelerated northern development on caribou and reindeer populations and ecology. Proc. First Intl. Reindeer and Caribou Symp., Biol. Pap., Univ. Alaska - Spec. Rep. No. 1:4-9.

Weise, T. F., W. L. Robinson, R. A. Hook, and L. D. Mech. 1975. An experimental translocation of the eastern timber wolf. Audubon Cons. Rep. 5:1-28.

Werner, W. E. 1956. Mammals of the Thousand Islands Region, New York. J. Mammal. 37:395-406.

Westover, A. J. 1971. The use of a hemlock-hardwood winter yard by white-tailed deer in northern Michigan. Occ. Pap. Huron Mountain Wildlife Foundation. No. 1, 59 pp.

Wolfe, M. L., and D. L. Allen. 1973. Continued studies of the status, socialization, and relationships of Isle Royale wolves, 1967 to 1970. J. Mammal. 54:611-633.

Wright, M. I. 1978. Mammals of the St. Lawrence Region: Baseline studies and proposals for impact assessment of winter navigation. M. S. Thesis, St. Univ. New York, Coll. Envir., Sci., and For., Syracuse, N.Y. 116 pp.

## APPENDIX A:

## FIELD NOTES CONCERNING OBSERVATIONS OF DEER OR THEIR TRACKS AT SHIP CHANNELS, WINTER 1979-80.

5 February (W.Robinson, T.Fuller, J.Huff) - At 1125 hr we were checking out tracks crossing between St. Joseph Island and Neebish Island. The ice-breaker Katmai Bay had passed downstream about an hour earlier, the first vessel to pass since 15 January. The boat had cracked the ice beside its path about 30 m and had left in its immediate path an area about 15 m wide containing chunks of ice about 0.2 to 1.0 m in diameter with open water in between. We were standing about 50 m east of the ship channel, 120 m from the freshly cut channel in the middle, 300 m from shore. We noticed 2 deer on the ice about 100 to 200 m south of Johnson Point on the Neebish side, about 100 m from shore, and headed toward us at a moderate walk. We stopped to watch. The 2 deer, a doe and her fawn, continued toward us at a fast walk with the apparent intention of crossing the ship track about 150 to 200 m upstream from us. As the doe, leading the fawn by about 20 m, reached the edge of broken ice from the old ship track she paused and looked alert. She took a few steps closer to the ship track put her head down and sniffed the ice. This occurred about 5 to 10 m from the open Katmai Bay track. She quickly turned away and moved at a trot 20 m southwest than slowed to a walk. She made one more move toward the channel but apparently recognized it as an impasse before approaching closer than 20 m. She led her fawn west-wouthwest back to the Neebish Island side where they began grazing on brown grass along the shore. They remained there another 15 minutes, before moving slowly into the woods and out of sight.

We had earlier seen fresh tracks of a large deer and a small deer together crossing the channel (before the passage of the Katmai Bay, judging from the fact that alignment of tracks had been distorted by ice pushed around) from St. Joseph to Neebish Islands. It is possible that the tracks were of these 2 deer which were now attempting to return, but their attempt was thwarted by the fresh cahnnel. We were certain that the deer were not aware of us as they never looked directly at us (we were toward the sun) and down-wind of them.

7 February (T.Fuller, J.Huff) - At about 1200 hr, Huff observed a single deer crossing the last 150 m of ice from just north of the tip of Johnson Point on Neebish Island to St. Joseph Island. At about 1330 hr we located the tracks and followed them backward to the shore at Johnson Point. The Katmai Bay had passed through the channel about 24 hr earlier. The tracks revealed that the deer had come out to the ship track directly from shore and stopped and stood about 3 m from the ship track. The ship track itself was about 12-15 m across, with ice chunks $\leq$0.3 m in diameter, refrozen together. Huff and I could walk across the track, but the ice was smooth and very slippery. No open water was present. After stopping, the deer had traveled 35 m north, paralleling the ship track, then attempted to cross. It stopped at the edge of the track where the ice became glare, then turned

back and traveled another 40 m up the channel, 5 m from the ship track, where it stopped and stood again. It then moved another 15 m up the ship track, attempted to cross, turned back, continued another 50 m, attempted a third crossing, and turned back again. It then traveled 45 m further up the channel and finally crossed. No observable differences in the ice conformation in the ship track were noticed at the crossing point. One-third of the way to shore, about 100 m from the ship track, where we first observed the deer, the deer had urinated then continued on.

8 February (T.Fuller, J.Huff) - At about 1100 hr we checked out tracks on the ground near the east end of Middle Neebish Channel which had been observed from the air on 7 Feb. One set of tracks was made by 4 deer about 12 hours after the passage of the icebreaker on 6 Feb. The deer had traveled from Sugar Island directly south to where the ship had fractured the ice into large ($\geq 5$ $m^2$) plates, about 50-60 m from the actual ship track. The deer then turned downriver, walked 25 m, then 1 deer walked 1-2 m toward the channel before turning back. After walking another 10 m, the group turned back upriver, paralleling the ship track again for 50-60 m, but always walking on unfractured ice. Three of the deer turned toward the ship track, but then returned to their original path and continued on for another 40 m, where all 4 deer walked 4-5 m towards the channel. They turned back again and resumed their path for 25 m, where 1 deer again moved toward the channel, then rejoined the group. All 4 deer traveled another 20 m, turned toward the ship track and walked 10-15 m across the fractured ice plates before turning back once again. The deer then traveled directly back to the Sugar Island shoreline, and went into the woods.

22 March (J.Huff) - The Katmai Bay passed through the Munuscong Channel, southbound, at approximately 0945 hr. At 1022 hr 3 deer (2 adults, 1 fawn) came out onto the ice from Neebish Island south of Johnson Point. They arrived at the edge of the ship track at 1029 hr. They turned around and went directly back to Neebish Island and grazed in a yard until 1045 hr. At 1117 hr 2 deer (1 adult, 1 fawn) went out on the ice south of Johnson Point. These are probably 2 of the 3 deer seen earlier. They arrived at the ship track at 1123 hr. These 2 did not leave the solid ice either. At 1128 they were back on the shore grazing. Three minutes later another attempt to cross was made. Both deer trotted out to the ship track and stopped. They stood there for about 15 seconds before 2 dogs barking at my truck alarmed them. Both deer went back to Neebish. Although the two dogs may have prevented the crossing, I think this is very unlikely. Between 1407 and 1411 hr, 8 deer came onto the ice. Four of these (2 adults and 2 fawns) went to the ship track and paralleled it for approximately 75 m downstream before attempting a crossing. The other 4 deer followed the first group of deer but did not leave the solid ice. The first 4 deer walked in single file with very short, stiff strides and hunched backs. Their heads were close to the ice while walking. At 1423 hr, when the deer were about ¼ of the way across the ship track, the lead deer fell through. The other 3 deer bunched up and 2 more of them also fell through. All 3 deer were out of the water within 5 seconds of falling in. All 4 deer went back to solid ice and met up with the other 4 deer, which had not attempted to cross, about 25 m from the ship track at 1425 hr. All 8 deer went back to shore and were gone into the woods by 1440 hr.

## APPENDIX B

### Data

Coded data for all tracks observed on the ice of the St. Mary's River, January through March, 1980 are presented in this Appendix. A key to the code precedes the data. Two maps (Appendix B, Figures 1 and 2) include a grid system on which coordinates of the track locations were described, and a third map (Appendix B, Figure 3) shows the alphabetically coded channel segments. The grid system is used as X and Y coordinates. For example, the coordinates of an animal departing the northern tip of Lime Island (Appendix B, Figure 1) would be described (by using a millimeter rule to interpolate between grid lines) as 1317, 1088. If the animal crossed the channel moving easterly from the northern tip of Lime Island, the letter G would follow the first coordinate in column E of the data, indicating the coded channel letter, taken from the map (Appendix B, Figure 3).

KEY TO COLUMN LABELS

A--SPECIES: (B)BOBCAT,(C)COYOTE,(D)DEER,(F)FOX,(G)DOG,(K)MUSTELID,(L)LYNX,(M)MOOSE,
(N)CANID,(O)OTTER,(U)UNKNOWN,(W)WOLF
B--OBSERVED FROM: (A)AIR,(G)GROUND,(B)BOTH
C--DATE: MONTH,DAY
D,E,F,G--LOCATION COORDINATES: FROM GRID ON MAPS, APPENDIX B, FIGURES 1 AND 2
H--NUMBER OF ANIMALS
I--AGE OF TRACK IN HOURS
J--DIRECTION OF TRAVEL
K--CHANNEL CROSSING: (C)CROSSED WINTER SHIP TRACK,(N)NOT CROSSED WINTER SHIP TRACK,
(P)POSSIBLE CROSSING OF WINTER SHIP TRACK,(CX)CROSSED OTHER CHANNEL,
(NX)NOT CROSSED OTHER CHANNEL,(PX)POSSIBLY CROSSED OTHER CHANNEL
L--MAXIMUM DISTANCE FROM SHORE IN TENS OF METERS
M--TYPE OF MOVEMENT: (1)DIRECT,(2)SEMI-DIRECT,(3)MEANDER,(4)HUNTING,(5)CHASED,
(6)SWIMMING,(7)TURNED BACK FROM SHIP TRACK,(8)SEVERAL ATTEMPTS, THEN
CROSSED,(9)TURNED BACK FROM OTHER THAN SHIP TRACK
N--WIDTH OF CHANNEL IN HUNDREDS OF METERS
O--ON SHORE SNOW DEPTH AT DEPARTURE IN CENTIMETERS
P--ON SHORE SNOW DEPTH AT ARRIVAL IN CENTIMETERS
Q--TIME SINCE SNOWFALL IN HOURS
R--MINIMUM SNOW DEPTH ON ICE IN CENTIMETERS
S--HABITAT TYPE AT DEPARTURE: (1)MARSH,(2)LOWLAND DECIDUOUS,(3)BLACK SPRUCE/
TAMARACK LOWLAND,(4)ALDER/WILLOW SWAMP,(5)CEDAR SWAMP,(6)MIXED CONIFER/
HARDWOOD,(7)UPLAND CONIFER-SPRUCE/JACK PINE,(8)UPLAND HARDWOODS,
(9)FIELD/BRUSH,(0)RESIDENTIAL,(C)CEDAR/RESIDENTIAL,(L)LOWLAND DECIDUOUS/
RESIDENTIAL
T--HABITAT TYPE AT ARRIVAL: SAME CODE AS ABOVE
U--TIME SINCE SHIP PASSAGE IN HOURS
V--DISTANCE TRAVELED ON ICE IN HUNDREDS OF METERS
W--ICE CONDITION: (1)GLARE,(2)WINDBLOWN/SOME SNOW/SMOOTH,(3)SNOW COVERED 0 TO 3
INCHES,(4)SNOW COVERED OVER THREE INCHES,(5)WET
X--SNOW CONDITION ON SHORE: (C)CRUSTY,(D)DENSE,(F)FLUFFY,(M)FLUFFY ON CRUSTY
Y--CHANNEL SEGMENT: FROM MAP, APPENDIX B, FIGURE 3

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | A | 0105 | 1234 | 1156K | | | 01 | | | N | 15 | 5 | 48 | | | | | | | | 01 | 3 | | D |
| N | A | 0105 | 1234 | 1156I | 1231 | 1156L | 03 | | | N | 15 | 1 | 48 | | | | | | | 99 | 02 | 3 | | D |
| N | A | 0105 | 1234 | 1156I | 1231 | 1156L | 03 | | | N | 15 | 1 | 48 | | | | | | | 99 | 02 | 3 | | D |
| N | A | 0105 | 1234 | 1156I | 1231 | 1156L | 03 | | | N | 15 | 1 | 48 | | | | | | | 99 | 02 | 3 | | D |
| U | A | 0109 | 1240 | 1150I | 1238 | 1150L | 01 | | | N | 05 | | 45 | | | 33 | 05 | | | 99 | 05 | 3 | | D |
| C | G | 0114 | 1142 | 1331D | 1138 | 1336A | 01 | 12 | NW | PX | | 2 | 07 | | | 18 | 01 | | 1 | | 11 | 2 | D | J |
| C | G | 0114 | 1141 | 1335D | 1147 | 1337A | 01 | 12 | F | CX | | 1 | 07 | | | 18 | 01 | 1 | 4 | | 06 | 2 | D | J |
| C | G | 0114 | 1146 | 1330D | 1138 | 1338A | 01 | 12 | NW | CX | | 1 | 07 | | | 18 | 01 | 4 | 1 | | 11 | 2 | D | J |
| C | G | 0114 | 1147 | 1326D | 1139 | 1335A | 01 | 12 | NW | CX | | 1 | 07 | | | 18 | 01 | 4 | 1 | | 11 | 2 | D | J |
| C | G | 0115 | 1156 | 1337D | 1161 | 1338F | 01 | 36 | F | N | 08 | 2 | 20 | | | 48 | 01 | 1 | | 48 | 02 | 4 | D | C |
| C | G | 0115 | 1156 | 1337D | 1161 | 1338F | 01 | 36 | F | N | 08 | 2 | 20 | | | 48 | 01 | 1 | | 48 | 02 | 4 | D | C |
| C | G | 0115 | 1175 | 1339D | 1168 | 1338A | 01 | 36 | W | N | 03 | 2 | 10 | | | 48 | 01 | 2 | 2 | 48 | 07 | 2 | D | P |
| C | G | 0121 | | | 1195 | 1340A | 01 | 14 | F | N | 06 | 1 | 09 | | | 16 | 00 | | 8 | 99 | 03 | 2 | C | P |
| U | A | 0121 | 0943 | 1566I | | | 01 | 15 | | N | 35 | 1 | 20 | | | 15 | 04 | | | 99 | 03 | 3 | | B |
| U | A | 0121 | 0945 | 1516I | 0944 | 1520I | 01 | 15 | | N | 50 | 1 | 30 | | | 15 | 02 | | | 99 | 03 | 3 | | B |
| U | A | 0121 | 0955 | 1497I | 0957 | 1500I | 01 | 15 | | N | 35 | 1 | 10 | | | 15 | 04 | | | 99 | 03 | 3 | | B |
| C | B | 0121 | 0967 | 1527B | 0965 | 1530A | 01 | 12 | N | P | 20 | 1 | 23 | | | 12 | 02 | | 4 | 99 | 02 | 3 | C | B |
| C | B | 0121 | 0964 | 1527B | 0975 | 1538F | 01 | 14 | F | N | 20 | 1 | 23 | | | 14 | 02 | 4 | | 99 | 20 | 3 | C | B |
| U | A | 0121 | 1095 | 1477L | 1100 | 1478L | 01 | 12 | | N | 10 | 1 | 10 | | | 12 | 02 | 6 | 4 | 99 | 02 | 3 | C | C |
| U | A | 0121 | 1090 | 1519I | | | 01 | 12 | | NX | 04 | 3 | 06 | | | 12 | 02 | 6 | | | 03 | 3 | C | D |
| U | A | 0121 | 1103 | 1480L | 1115 | 1480L | 02 | 12 | | N | | 1 | 15 | | | 12 | 02 | 4 | 6 | 99 | 15 | 3 | | C |
| U | A | 0121 | 1103 | 1480L | 1115 | 1480L | 02 | 12 | | N | | 1 | 15 | | | 12 | 02 | 4 | 6 | 99 | 15 | 3 | | C |
| U | A | 0121 | 1115 | 1455I | | | 01 | 12 | | N | 20 | 1 | 20 | | | 12 | 02 | | | 99 | 02 | 2 | | C |
| U | A | 0121 | 1113 | 1472I | 1116 | 1472L | 01 | 12 | | P | 50 | 1 | 22 | | | 12 | 02 | 6 | | 99 | 05 | 3 | | C |
| D | G | 0121 | 1187 | 1339K | | | 01 | | | N | 19 | | 06 | | | 14 | 00 | | | 99 | 02 | 1 | C | P |
| U | A | 0121 | 1205 | 1327L | 1206 | 1328L | 01 | 12 | | N | 10 | 1 | 10 | | | 12 | 00 | 6 | 3 | 99 | 01 | 2 | | P |
| C | G | 0121 | 1206 | 1337B | 1207 | 1337A | 01 | 14 | NE | N | 03 | 2 | 08 | | | 14 | 00 | | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1204 | 1340 | 1204 | 1340A | 03 | 10 | NW | N | 02 | 3 | 08 | | | 14 | 00 | 8 | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1204 | 1340 | 1204 | 1340A | 03 | 10 | NW | N | 02 | 3 | 08 | | | 14 | 00 | 8 | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1204 | 1340 | 1204 | 1340A | 03 | 10 | NW | N | 02 | 3 | 08 | | | 14 | 00 | 8 | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1202 | 1342D | 1202 | 1342A | 02 | 10 | | N | 03 | 2 | 08 | | | 14 | 00 | 8 | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1202 | 1342D | 1202 | 1342A | 02 | 10 | | N | 03 | 2 | 08 | | | 14 | 00 | 8 | 8 | 99 | 01 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| D | G | 0121 | 1208 | 1337D | 1207 | 1337A | 12 | 06 | SW | N | 30 | 9 | 08 | | | 13 | 00 | 8 | 8 | 99 | 07 | 2 | C | P |
| C | B | 0121 | 1954 | 1523B | 1963 | 1524A | 01 | 14 | NE | N | 20 | 1 | 27 | | | 14 | 00 | | 1 | 99 | 09 | 2 | C | B |
| C | B | 0121 | 1963 | 1524L | 1963 | 1521I | 01 | 12 | | P | 22 | 1 | 26 | | | 14 | 00 | 1 | | 99 | 03 | 2 | C | B |
| U | A | 0124 | 0953 | 1489I | 0953 | 1488I | 01 | 12 | | N | 04 | 1 | 10 | | | 12 | | 4 | | 99 | 01 | 2 | | B |
| U | A | 0124 | 0979 | 1540I | 0988 | 1536L | 03 | 12 | | N | 40 | 1 | 30 | | | 12 | | 4 | 6 | 99 | 10 | 2 | | B |
| U | A | 0124 | 0979 | 1540I | 0988 | 1536L | 03 | 12 | | N | 40 | 1 | 30 | | | 12 | | 4 | 6 | 99 | 10 | 2 | | B |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | A | 0124 | 0979 | 1540I | 0988 | 1536L | 03 | 12 | | N | 40 | 1 | 30 | | | 12 | | 4 | 6 | 99 | 10 | 2 | | B |
| F | A | 0124 | 1011 | 1531L | 1011 | 1528I | 01 | 12 | | C | | 1 | 02 | | | 12 | | | 9 | 99 | 02 | 2 | | B |
| U | A | 0124 | 1119 | 1561L | 1121 | 1560I | 01 | 12 | | NX | 30 | 1 | 08 | | | 12 | | 6 | | | 03 | 3 | | O |
| U | A | 0124 | 1128 | 1575L | 1134 | 1575L | 01 | 12 | | NX | 15 | 1 | 09 | | | 12 | | 4 | 3 | | 05 | 3 | | O |
| U | A | 0124 | 1129 | 1565I | | | 01 | 12 | | NX | 04 | 2 | 09 | | | 12 | 00 | | | | 01 | 2 | | P |
| U | A | 0124 | 1182 | 1340I | | | 01 | 12 | | N | 12 | 1 | 06 | | | 12 | 00 | | | 99 | 01 | 2 | | P |
| U | A | 0124 | 1187 | 1223L | 1193 | 1232L | 02 | 12 | | PX | 60 | 1 | 20 | | | 12 | | 8 | | | 12 | 2 | | H |
| U | A | 0124 | 1187 | 1223L | 1193 | 1232L | 02 | 12 | | PX | 60 | 1 | 20 | | | 12 | | 8 | | | 12 | 2 | | H |
| U | A | 0124 | 1181 | 1270I | | | 01 | 12 | | N | 07 | 1 | 37 | | | 12 | 00 | 6 | | 99 | 01 | 2 | | O |
| U | A | 0124 | 1184 | 1242I | | | 01 | 12 | | NX | 05 | 1 | 12 | | | 12 | | 8 | | | 01 | 2 | | H |
| U | A | 0124 | 1193 | 1336I | | | 01 | 12 | | N | 05 | 1 | 05 | | | 12 | | | | 99 | 01 | 2 | | P |
| U | A | 0124 | 1286 | 1117L | 1288 | 1115I | 01 | 12 | | P | 30 | 1 | 30 | | | 12 | 00 | 6 | | 99 | 03 | 2 | | E |
| D | B | 0124 | 1334 | 1003K | | | 01 | 12 | | N | 05 | 5 | 50 | | 05 | 12 | 03 | | 6 | 99 | 01 | 3 | F | F |
| C | B | 0124 | 1334 | 1003B | | | 02 | 12 | | N | 05 | 4 | 50 | | 03 | 12 | 03 | | 6 | 99 | 01 | 3 | F | F |
| C | B | 0124 | 1334 | 1003B | | | 02 | 12 | | N | 05 | 4 | 50 | | 03 | 12 | 03 | | 6 | 99 | 01 | 3 | F | F |
| U | A | 0126 | 1096 | 1480I | | | 01 | 12 | | N | 50 | 1 | 10 | | | 12 | 03 | 9 | | 99 | 10 | 3 | F | C |
| U | A | 0126 | 1108 | 1530I | | | 01 | 12 | | NX | 50 | 2 | 07 | | | 12 | 03 | | | | 02 | 3 | F | O |
| U | A | 0126 | 1102 | 1480L | 1115 | 1478L | 02 | 12 | | N | | 1 | | | | 12 | 03 | 6 | 6 | 99 | 15 | 3 | F | C |
| U | A | 0126 | 1102 | 1480L | 1115 | 1478L | 02 | 12 | | N | | 1 | | | | 12 | 03 | 6 | 6 | 99 | 15 | 3 | F | C |
| U | A | 0126 | 1113 | 1538I | | | 01 | 12 | | NX | 15 | 2 | 05 | | | 12 | | 6 | | | 02 | 3 | F | O |
| U | A | 0126 | 1127 | 1560I | | | 01 | 12 | | NX | 10 | 2 | 08 | | | 12 | 03 | 6 | | | 02 | 3 | F | O |
| U | A | 0126 | 1147 | 1329L | 1140 | 1331L | 02 | 12 | | CX | | 1 | 07 | | | 12 | 03 | 6 | | | 08 | 3 | F | J |
| U | A | 0126 | 1147 | 1329L | 1140 | 1331L | 02 | 12 | | CX | | 1 | 07 | | | 12 | 03 | 6 | | | 08 | 3 | F | J |
| H | A | 0126 | 1163 | 1385I | | | 01 | 12 | | N | 50 | 2 | 30 | | | 12 | 03 | 4 | | 99 | 08 | 3 | F | C |
| D | B | 0126 | 1206 | 1337D | 1200 | 1331A | 03 | 15 | S | C | | 1 | 08 | 08 | | 12 | 03 | 6 | 6 | 99 | 08 | 3 | F | P |
| D | B | 0126 | 1206 | 1337D | 1200 | 1331A | 03 | 15 | S | C | | 1 | 08 | 08 | | 12 | 03 | 6 | 6 | 99 | 08 | 3 | F | P |
| D | B | 0126 | 1206 | 1337D | 1200 | 1331A | 03 | 15 | S | C | | 1 | 08 | 08 | | 12 | 03 | 6 | 6 | 99 | 08 | 3 | F | P |
| U | A | 0126 | 1211 | 1325L | 1220 | 1326L | 01 | 12 | | C | | 1 | 13 | | | 12 | 04 | 9 | 6 | 99 | 13 | 3 | F | O |
| U | A | 0126 | 1228 | 1248L | 1232 | 1246L | 01 | 12 | | C | | 1 | 10 | | | 12 | 03 | 9 | 6 | 99 | 50 | 3 | F | R |
| U | A | 0126 | 1231 | 1258L | 1235 | 1256L | 02 | 12 | | C | | 1 | 05 | | | 12 | 03 | 6 | 0 | 99 | 05 | 3 | F | R |
| U | A | 0126 | 1231 | 1258L | 1235 | 1256L | 02 | 12 | | C | | 1 | 05 | | | 12 | 03 | 6 | 0 | 99 | 05 | 3 | F | R |
| D | A | 0126 | 1230 | 1256L | 1235 | 1252L | 03 | 12 | | C | | 1 | 06 | | | 12 | 03 | 6 | 0 | 99 | 06 | 3 | F | R |
| D | A | 0126 | 1230 | 1256L | 1235 | 1252L | 03 | 12 | | C | | 1 | 06 | | | 12 | 03 | 6 | 0 | 99 | 06 | 3 | F | R |
| D | A | 0126 | 1230 | 1256L | 1235 | 1252L | 03 | 12 | | C | | 1 | 06 | | | 12 | 03 | 6 | 0 | 99 | 06 | 3 | F | R |
| U | A | 0126 | 1314 | 1090L | 1292 | 1118L | 01 | 12 | | C | | 1 | 35 | | | 12 | 03 | 6 | 6 | 99 | 40 | 3 | F | F |
| U | A | 0126 | 1320 | 1108I | | | 01 | 12 | | P | 99 | 1 | 50 | | | 12 | 03 | 8 | | 99 | 02 | 3 | F | F |
| G | A | 0126 | 1333 | 1012I | | | 01 | | | N | 07 | | | | | 12 | | | | 99 | | | | F |
| U | A | 0127 | 1104 | 1485L | 1116 | 1479L | 01 | 12 | | N | | 1 | 10 | | | 12 | | 6 | 4 | 99 | 13 | 3 | | C |
| U | A | 0127 | 1115 | 1472I | | | 01 | 12 | | P | 10 | 1 | | | | 12 | | 6 | | 99 | 01 | 3 | | C |
| U | A | 0127 | 1124 | 1449I | 1126 | 1444I | 01 | 12 | | N | 15 | 2 | 20 | | | 12 | | 6 | 6 | 99 | 05 | 3 | | C |
| C | B | 0127 | 1138 | 1345D | 1147 | 1336A | 01 | 12 | SF | CX | | 1 | 11 | 08 | 08 | 12 | 04 | 4 | 8 | | 11 | 3 | F | J |
| G | M | 0127 | 1147 | 1327D | 1139 | 1316A | 02 | 12 | SW | CX | | 2 | 08 | 08 | 08 | 12 | 04 | 4 | 0 | 99 | 16 | 3 | F | J |
| G | M | 0127 | 1147 | 1327D | 1139 | 1316A | 02 | 12 | SW | CX | | 2 | 08 | 08 | 08 | 12 | 04 | 4 | 0 | 99 | 16 | 3 | F | J |
| G | B | 0127 | 1142 | 1328D | 1147 | 1328A | 02 | 12 | F | CX | | 1 | 05 | 08 | 08 | 12 | 04 | 6 | 4 | | 05 | 3 | C | J |
| G | B | 0127 | 1142 | 1328D | 1147 | 1328A | 02 | 12 | F | CX | | 1 | 05 | 08 | 08 | 12 | 04 | 6 | 4 | | 05 | 3 | C | J |
| U | A | 0127 | 1164 | 1384I | | | 01 | 12 | | N | 15 | 1 | 30 | | | 12 | 01 | 6 | | 99 | 01 | 3 | | C |
| D | B | 0127 | 1179 | 1337D | 1183 | 1345A | 03 | 12 | N | C | | 1 | 08 | | | 12 | 07 | | 1 | 99 | 08 | 3 | M | P |
| D | B | 0127 | 1179 | 1337D | 1183 | 1345A | 03 | 12 | N | C | | 1 | 08 | | | 12 | 07 | | 1 | 99 | 08 | 3 | M | P |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | B | 0127 | 1179 | 1337D | 1183 | 1345A | 03 | 12 | N | C | | 1 | 08 | | | 12 | 07 | | 1 | 99 | 08 | 3 | M | P |
| C | B | 0127 | 1184 | 1339B | 1185 | 1343A | 03 | 12 | N | C | | 1 | 08 | | | 14 | 07 | | 2 | 99 | 04 | 3 | M | P |
| C | B | 0127 | 1184 | 1339B | 1185 | 1343A | 03 | 12 | N | C | | 1 | 08 | | | 14 | 07 | | 2 | 99 | 04 | 3 | M | P |
| C | B | 0127 | 1187 | 1342D | 1186 | 1336A | 02 | 12 | S | C | | 2 | 06 | 05 | | 12 | 05 | 1 | 6 | 99 | 06 | 3 | M | P |
| C | B | 0127 | 1187 | 1342D | 1186 | 1336A | 02 | 12 | S | C | | 2 | 06 | 05 | | 12 | 05 | 1 | 6 | 99 | 06 | 3 | M | P |
| C | B | 0127 | 1184 | 1339B | 1185 | 1343A | 03 | 12 | N | C | | 1 | 08 | | | 14 | 07 | | 2 | 99 | 04 | 3 | M | P |
| C | B | 0127 | 1194 | 1335D | 1187 | 1343A | 01 | 12 | N | C | | 2 | 06 | | | 12 | 07 | 6 | 1 | 99 | 10 | 3 | M | P |
| C | B | 0127 | 1199 | 1333D | 1194 | 1343A | 01 | 12 | NW | C | | 3 | 08 | | | 12 | 07 | 8 | 8 | 99 | 10 | 3 | M | P |
| C | B | 0127 | 1207 | 1337D | 1201 | 1332 | 01 | 12 | SW | C | | 1 | 09 | | | 12 | 05 | 6 | | 99 | 09 | 3 | M | P |
| C | B | 0127 | 1204 | 1327D | 1206 | 1327A | 02 | 12 | E | N | | 2 | 11 | | | 12 | 05 | 8 | 6 | 99 | 02 | 3 | M | P |
| C | B | 0127 | 1204 | 1327D | 1206 | 1327A | 02 | 12 | E | N | | 2 | 11 | | | 12 | 05 | 8 | 6 | 99 | 02 | 3 | M | P |
| U | M | 0127 | 1206 | 1327L | 1209 | 1329L | 02 | 12 | | N | 40 | 1 | 08 | | | 12 | 01 | 6 | 9 | 99 | 03 | 3 | | Q |
| U | M | 0127 | 1206 | 1327L | 1209 | 1329L | 02 | 12 | | N | 40 | 1 | 08 | | | 12 | 01 | 6 | 9 | 99 | 03 | 3 | | Q |
| D | B | 0127 | 1217 | 1283D | 1226 | 1285A | 02 | 12 | W | C | | 1 | 09 | 09 | 10 | 12 | 01 | C | C | 99 | 09 | 3 | M | Q |
| D | B | 0127 | 1219 | 1281D | 1226 | 1283A | 01 | 12 | E | C | | 2 | 08 | 10 | 10 | 12 | 01 | 5 | C | 99 | 09 | 3 | M | Q |
| D | B | 0127 | 1217 | 1283D | 1226 | 1285A | 02 | 12 | W | C | | 1 | 09 | 09 | 10 | 12 | 01 | C | C | 99 | 09 | 3 | M | Q |
| C | B | 0127 | 1219 | 1280D | 1226 | 1283A | 01 | 12 | E | C | | 1 | 08 | 10 | 10 | 12 | 01 | 5 | C | 99 | 08 | 3 | M | Q |
| C | M | 0127 | 1227 | 1245D | 1233 | 1243A | 01 | 12 | E | C | | 1 | 05 | 05 | 07 | 12 | 01 | 9 | 6 | 99 | 05 | 3 | M | R |
| C | M | 0127 | 1225 | 1284I | 1226 | 1281I | 01 | 12 | | N | 05 | 1 | 09 | | | 12 | 01 | | | 99 | 02 | 3 | | Q |
| G | B | 0127 | 1226 | 1245D | 1234 | 1242A | 02 | 12 | E | C | | 1 | 08 | 05 | 07 | 12 | 01 | 9 | 6 | 99 | 10 | 3 | M | R |
| G | B | 0127 | 1226 | 1245D | 1234 | 1242A | 02 | 12 | E | C | | 1 | 08 | 05 | 07 | 12 | 01 | 9 | 6 | 99 | 10 | 3 | M | R |
| D | B | 0127 | 1221 | 1278D | 1228 | 1279A | 01 | 12 | E | C | | 2 | 08 | 10 | 09 | 12 | 01 | 5 | 1 | 99 | 08 | 3 | M | Q |
| D | B | 0127 | 1226 | 1269D | 1230 | 1269I | 05 | 12 | NE | C | 40 | 9 | 07 | 09 | 10 | 12 | 02 | C | C | 99 | 08 | 3 | M | R |
| D | B | 0127 | 1226 | 1269D | 1230 | 1269I | 05 | 12 | NE | C | 40 | 9 | 07 | 09 | 10 | 12 | 02 | C | C | 99 | 08 | 3 | M | R |
| D | B | 0127 | 1226 | 1269D | 1230 | 1269I | 05 | 12 | NE | C | 40 | 9 | 07 | 09 | 10 | 12 | 02 | C | C | 99 | 08 | 3 | M | R |
| D | B | 0127 | 1226 | 1269D | 1230 | 1269I | 05 | 12 | NE | C | 40 | 9 | 07 | 09 | 10 | 12 | 02 | C | C | 99 | 08 | 3 | M | R |
| D | B | 0127 | 1226 | 1269D | 1230 | 1269I | 05 | 12 | NE | C | 40 | 9 | 07 | 09 | 10 | 12 | 02 | C | C | 99 | 08 | 3 | M | R |
| U | A | 0127 | 1220 | 1326L | 1217 | 1326I | 01 | 12 | | P | 30 | 1 | 11 | | | 12 | | 6 | | 99 | 03 | 3 | | Q |
| G | B | 0127 | 1234 | 1249D | 1228 | 1249A | 02 | 12 | W | C | | 2 | 08 | 07 | 05 | 12 | 01 | 5 | 9 | 99 | 08 | 3 | C | R |
| G | B | 0127 | 1234 | 1249D | 1228 | 1249A | 02 | 12 | W | C | | 2 | 08 | 07 | 05 | 12 | 01 | 5 | 9 | 99 | 08 | 3 | C | R |
| C | B | 0127 | 1233 | 1243D | 1227 | 1246A | 01 | 12 | W | C | | 1 | 05 | 07 | 05 | 12 | 01 | | 9 | 99 | 05 | 3 | M | R |
| C | M | 0127 | 1232 | 1272I | 1233 | 1271I | 01 | 12 | | N | 07 | 1 | 07 | | | 12 | 01 | | | 99 | 01 | 3 | | R |
| D | B | 0127 | 1236 | 1256D | 1231 | 1256A | 01 | 12 | W | C | | 1 | 08 | 07 | 08 | 12 | 01 | 5 | 9 | 99 | 08 | 3 | M | R |
| C | G | 0128 | 1139 | 1336D | 1147 | 1336A | 01 | 12 | E | CX | | 2 | 08 | 08 | 08 | 12 | 04 | 4 | 2 | | 10 | 3 | F | J |
| C | G | 0128 | 1146 | 1323D | 1139 | 1335A | 01 | 12 | NW | CX | | 2 | 07 | 08 | 08 | 12 | 04 | 8 | 1 | | 13 | 3 | F | J |
| C | G | 0129 | 1145 | 1332I | 1146 | 1332I | 01 | 60 | | PX | 20 | 1 | 06 | | | 12 | 04 | | | | 01 | 3 | | J |
| U | G | 0128 | 1140 | 1330I | | | 01 | 60 | | PX | 10 | 1 | 07 | | | 12 | 03 | 6 | | | 01 | 3 | | J |
| G | G | 0129 | 1146 | 1343B | 1147 | 1337A | 01 | 12 | S | CX | 80 | 1 | 15 | | 08 | 12 | 04 | | 2 | | 08 | 3 | M | J |
| C | G | 0128 | 1152 | 1335D | 1138 | 1341A | 01 | 12 | NW | CX | | 2 | 10 | 08 | 08 | 12 | 04 | 4 | 4 | | 16 | 3 | F | J |
| C | G | 0129 | 1150 | 1338I | 1149 | 1336L | 01 | 60 | | PX | 20 | 1 | 10 | | 08 | 12 | 03 | | 2 | | 02 | 3 | | J |
| C | G | 0128 | 1182 | 1346D | 1178 | 1347 | 02 | 06 | E | N | 15 | 3 | 07 | 07 | | 12 | 05 | 4 | | 99 | 08 | 3 | M | P |
| C | G | 0129 | 1182 | 1346D | 1178 | 1347 | 02 | 06 | E | N | 15 | 3 | 07 | 07 | | 12 | 05 | 4 | | 99 | 08 | 3 | M | P |
| C | G | 0128 | 1187 | 1343D | 1187 | 1343A | 03 | 38 | | N | 20 | 1 | | 07 | 07 | 14 | 07 | 8 | 8 | 99 | 04 | 3 | M | P |
| C | G | 0129 | 1187 | 1343D | 1187 | 1343A | 03 | 38 | | N | 20 | 1 | | 07 | 07 | 14 | 07 | 8 | 8 | 99 | 04 | 3 | M | P |
| C | G | 0128 | 1187 | 1343D | 1187 | 1343A | 03 | 38 | | N | 20 | 1 | | 07 | 07 | 14 | 07 | 8 | 8 | 99 | 04 | 3 | M | P |
| C | G | 0129 | 1199 | 1387D | 1206 | 1386A | 01 | 20 | W | CX | | 2 | 09 | 05 | | 16 | 04 | 6 | 6 | | 11 | 3 | M | L |
| C | G | 0128 | 1194 | 1343D | 1204 | 1340A | 01 | 36 | W | N | 05 | 1 | 08 | 15 | 15 | 12 | 05 | 8 | 8 | 99 | 10 | 3 | M | P |
| C | G | 0129 | 1202 | 1341D | 1203 | 1341A | 01 | 38 | E | N | 17 | 1 | | | | 14 | 07 | 1 | 6 | 99 | 01 | 3 | M | P |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | G | 0128 | 1205 | 1338D | 1203 | 1339F | 01 | 38 | W | N | 17 | 1 | | 04 | 04 | 12 | 07 | 6 | | 99 | 02 | 3 | M | P |
| C | G | 0123 | 1203 | 1379D | 1209 | 1379 | 01 | 20 | F | CX | | 1 | 06 | 05 | | 16 | 05 | 6 | 6 | | 06 | 3 | M | L |
| C | G | 0128 | 1209 | 1379D | 1202 | 1379A | 02 | 15 | F | CX | | 1 | 07 | | 10 | 16 | 04 | 7 | 6 | | 07 | 3 | M | L |
| C | G | 0123 | 1209 | 1379D | 1202 | 1379A | 02 | 15 | F | CX | | 1 | 07 | | 10 | 16 | 04 | 7 | 6 | | 07 | 3 | M | L |
| C | G | 0128 | 1203 | 1378D | 1209 | 1378 | 01 | 15 | W | CX | | 1 | 06 | | 10 | 16 | 04 | 6 | 6 | | 06 | 3 | M | L |
| C | G | 0128 | 1222 | 1328D | 1212 | 1334A | 01 | 12 | W | C | | 1 | 11 | | | 12 | 03 | 8 | 0 | 99 | 15 | 3 | M | P |
| U | A | 0129 | 0935 | 1516L | 0936 | 1508L | 03 | | | N | | 1 | 30 | | | 30 | 06 | 7 | 7 | 99 | 10 | 3 | | B |
| U | A | 0129 | 0935 | 1516L | 0936 | 1508L | 03 | | | N | | 1 | 30 | | | 30 | 06 | 7 | 7 | 99 | 10 | 3 | | B |
| U | A | 0129 | 0935 | 1516L | 0936 | 1508L | 03 | | | N | | 1 | 30 | | | 30 | 06 | 7 | 7 | 99 | 10 | 3 | | B |
| U | A | 0129 | 0948 | 1498L | 0949 | 1497I | 01 | | | P | 20 | 1 | 08 | | | 30 | 06 | 5 | | 99 | 02 | 3 | | B |
| E | M | 0202 | 1097 | 1473B | 1089 | 1474A | 01 | | NF | P | 30 | 1 | 10 | | 18 | 99 | 03 | | 0 | 99 | 73 | 3 | M | C |
| E | B | 0202 | 1090 | 1487D | 1085 | 1487F | 01 | 12 | W | C | | 9 | 05 | | | 99 | 04 | 4 | 4 | 99 | 14 | 3 | M | C |
| G | B | 0202 | 1101 | 1478D | 1095 | 1465A | 01 | 12 | SW | C | | 2 | 10 | | 05 | 99 | 03 | 4 | 0 | 99 | 13 | 3 | M | C |
| U | A | 0202 | 1119 | 1425I | 1125 | 1420I | 01 | | | C | | 1 | 20 | | | 99 | | | | 99 | 06 | 3 | | C |
| U | A | 0202 | 1130 | 1397I | 1135 | 1400I | 01 | | | C | | 1 | 27 | | | 99 | | | | 99 | 05 | 3 | | C |
| U | A | 0202 | 1130 | 1411I | 1131 | 1413I | 01 | | | N | 06 | 1 | 18 | | | 99 | | | | 99 | 02 | 3 | | C |
| U | B | 0202 | 1142 | 1368I | 1146 | 1370I | 01 | 59 | | C | | 1 | 30 | | | 99 | 05 | | | 99 | 05 | 3 | | C |
| E | B | 0202 | 1140 | 1350L | 1165 | 1350I | 02 | | | C | | 1 | 31 | | | 99 | 05 | 1 | | 99 | 20 | 3 | | C |
| E | B | 0202 | 1140 | 1350L | 1165 | 1350I | 02 | | | C | | 1 | 31 | | | 99 | 05 | 1 | | 99 | 20 | 3 | | C |
| C | B | 0202 | 1177 | 1338B | 1183 | 1343F | 01 | 12 | N | C | | 1 | 06 | | | 99 | 05 | 1 | 6 | 99 | 11 | 3 | M | P |
| C | B | 0202 | 1176 | 1346B | 1175 | 1338A | 01 | 12 | S | C | | 1 | 09 | | 07 | 99 | 05 | 6 | 1 | 99 | 05 | 3 | M | P |
| U | A | 0202 | 1173 | 1352L | 1160 | 1355I | 01 | | | C | | 1 | 35 | | | | | 6 | | 99 | 15 | 3 | | C |
| D | B | 0202 | 1188 | 1336D | 1190 | 1339F | 04 | 12 | N | C | | 1 | 07 | 18 | | 99 | 05 | 6 | 8 | 99 | 07 | 3 | M | P |
| D | B | 0202 | 1188 | 1336D | 1190 | 1339F | 04 | 12 | N | C | | 1 | 07 | 18 | | 99 | 05 | 6 | 8 | 99 | 07 | 3 | M | P |
| D | B | 0202 | 1188 | 1336D | 1190 | 1339F | 04 | 12 | N | C | | 1 | 07 | 18 | | 99 | 05 | 6 | 8 | 99 | 07 | 3 | M | P |
| D | B | 0202 | 1188 | 1336D | 1190 | 1339F | 04 | 12 | N | C | | 1 | 07 | 18 | | 99 | 05 | 6 | 8 | 99 | 07 | 3 | M | P |
| D | B | 0202 | 1199 | 1333D | 1204 | 1341A | 01 | 12 | NF | C | | 1 | 10 | 18 | | 99 | 05 | 4 | 6 | 99 | 10 | 3 | M | P |
| D | B | 0202 | 1197 | 1334D | 1199 | 1341A | 02 | 12 | N | C | | 1 | 08 | 18 | | 99 | 05 | 6 | 6 | 99 | 08 | 3 | M | P |
| D | B | 0202 | 1197 | 1334D | 1199 | 1341A | 02 | 12 | N | C | | 1 | 08 | 18 | | 99 | 05 | 6 | 6 | 99 | 08 | 3 | M | P |
| U | B | 0202 | 1194 | 1335L | 1195 | 1338I | 01 | 36 | N | C | | 1 | 08 | | | 99 | 05 | | | 99 | 03 | 3 | M | P |
| U | B | 0202 | 1192 | 1335L | 1194 | 1338I | 01 | 36 | | C | | 1 | 06 | | | 99 | 05 | | | 99 | 04 | 3 | M | P |
| B | B | 0202 | 1198 | 1342D | 1196 | 1334A | 01 | 12 | S | C | | 2 | 08 | | 07 | 99 | 05 | 6 | 6 | 99 | 09 | 3 | M | P |
| C | B | 0202 | 1207 | 1387D | 1198 | 1389A | 01 | 36 | W | CX | | 2 | 08 | | | 99 | 05 | 6 | 6 | | 10 | 3 | M | L |
| C | B | 0202 | 1205 | 1338D | 1200 | 1332A | 01 | 12 | SW | C | | 2 | 08 | | 07 | 99 | 05 | 6 | 4 | 99 | 09 | 3 | M | P |
| D | B | 0202 | 1205 | 1338D | 1201 | 1332A | 02 | 12 | SW | C | | 1 | 10 | | 18 | 99 | 05 | 6 | 4 | 99 | 10 | 3 | M | P |
| D | B | 0202 | 1205 | 1338D | 1201 | 1332A | 02 | 12 | SW | C | | 1 | 10 | | 18 | 99 | 05 | 6 | 4 | 99 | 10 | 3 | M | P |
| D | A | 0202 | 1213 | 1306L | 1227 | 1306L | 03 | 36 | | C | | 1 | 14 | | | 99 | | | | 99 | 14 | 3 | | Q |
| C | B | 0202 | 1214 | 1328D | 1218 | 1328F | 01 | 12 | NF | C | | 1 | 07 | 07 | | 99 | 05 | 9 | 8 | 99 | 05 | 3 | M | P |
| U | B | 0202 | 1211 | 1377D | 1204 | 1375A | 01 | 36 | W | CX | | 1 | 07 | | | 99 | 05 | 6 | 6 | | 08 | 3 | M | L |
| U | B | 0202 | 1214 | 1325I | 1215 | 1325I | 01 | 36 | | P | 65 | 1 | 13 | | | 99 | 05 | | | 99 | 02 | 3 | M | Q |
| U | A | 0202 | 1211 | 1360L | 1215 | 1360L | 02 | | | CX | | 1 | 04 | | | 99 | | 6 | 6 | | 04 | | M | L |
| U | A | 0202 | 1211 | 1360L | 1215 | 1360L | 02 | | | CX | | 1 | 04 | | | 99 | | 6 | 6 | | 04 | | M | L |
| U | A | 0202 | 1213 | 1302L | 01 | 12 | | C | | 1 | 14 | | | | | | | | | | | | | |
| U | A | 0202 | 1212 | 1308L | 1226 | 1316L | 01 | | | C | | 1 | 15 | | | 99 | | | | 99 | 15 | 3 | | O |
| D | A | 0202 | 1213 | 1306L | 1227 | 1306L | 03 | 36 | | C | | 1 | 14 | | | 99 | | | | 99 | 14 | 3 | | O |
| D | A | 0202 | 1213 | 1306L | 1227 | 1306L | 03 | 36 | | C | | 1 | 14 | | | 99 | | | | 99 | 14 | 3 | | O |
| U | A | 0202 | 1220 | 1230I | 1225 | 1230I | 01 | 12 | | C | | 1 | 32 | | | 99 | | | | 99 | 05 | 3 | | S |
| U | A | 0202 | 1275 | 1150I | 1280 | 1160I | 02 | | | C | | 1 | 35 | | | 99 | | | | 99 | 05 | 3 | | D |
| U | A | 0202 | 1275 | 1150I | 1280 | 1160I | 02 | | | C | | 1 | 35 | | | 99 | | | | 99 | 05 | 3 | | D |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | A | 0202 | 1298 | 1135I | 1292 | 1140I | 01 | | | N | 50 | 9 | 30 | | | 99 | | 6 | | 99 | 10 | 3 | | D |
| U | A | 0202 | 1302 | 1102I | 1314 | 1090I | 01 | | | C | | 1 | 35 | | | 99 | | | | 99 | 10 | 3 | | F |
| U | A | 0202 | 1321 | 1127L | 1325 | 1137L | 01 | | | N | | 1 | | | | 99 | | 4 | 4 | 99 | 10 | 3 | | D |
| U | A | 0202 | 1397 | 0985L | 1407 | 0985I | 01 | | | P | 90 | 1 | 30 | | | 99 | 00 | | | 99 | 09 | 2 | | F |
| C | G | 0203 | 1140 | 1342I | 1140 | 1349I | 01 | 12 | N | N | 50 | 2 | 35 | | | 99 | 05 | 1 | 1 | 99 | 12 | 3 | M | J |
| U | M | 0203 | 1184 | 1337I | 1186 | 1336I | 01 | 36 | | N | 25 | 2 | 07 | | | 99 | 05 | | | 99 | 05 | 3 | M | P |
| D | G | 0203 | 1209 | 1337D | 1202 | 1330A | 02 | 12 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 8 | 4 | 99 | 08 | 3 | M | P |
| D | G | 0203 | 1209 | 1337D | 1202 | 1330A | 02 | 12 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 8 | 4 | 99 | 08 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | G | 0203 | 1205 | 1337D | 1201 | 1332A | 09 | 36 | SW | C | | 1 | 07 | | 18 | 99 | 05 | 8 | 4 | 99 | 07 | 3 | M | P |
| D | M | 0203 | 1210 | 1336D | 1204 | 1330A | 04 | 36 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 6 | 8 | 99 | 08 | 3 | M | P |
| D | M | 0203 | 1210 | 1336D | 1204 | 1330A | 04 | 36 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 6 | 8 | 99 | 08 | 3 | M | P |
| D | M | 0203 | 1210 | 1336D | 1204 | 1330A | 04 | 36 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 6 | 8 | 99 | 08 | 3 | M | P |
| D | M | 0203 | 1210 | 1336D | 1204 | 1330A | 04 | 36 | SW | C | | 1 | 08 | | 18 | 99 | 05 | 6 | 8 | 99 | 08 | 3 | M | P |
| F | M | 0203 | 1214 | 1328D | 1218 | 1330F | 01 | 12 | F | C | | 2 | 07 | 05 | | 99 | 05 | 9 | | 99 | 04 | 3 | M | O |
| C | G | 0204 | 1198 | 1387D | 1206 | 1388A | 01 | 12 | F | CX | | 1 | 08 | 04 | | 99 | 05 | 6 | 6 | | 08 | 3 | M | L |
| C | G | 0204 | 1199 | 1382D | 1207 | 1387A | 01 | 36 | F | CX | | 1 | 07 | | | 99 | 05 | 6 | 6 | | 08 | 3 | M | L |
| C | G | 0204 | 1206 | 1391D | 1198 | 1389A | 02 | 36 | W | CX | | 1 | 09 | | | 99 | 05 | 6 | 6 | | 09 | 3 | M | L |
| C | G | 0204 | 1206 | 1391D | 1198 | 1389A | 02 | 36 | W | CX | | 1 | 09 | | | 99 | 05 | 6 | 6 | | 09 | 3 | M | L |
| U | M | 0204 | 1203 | 1378L | 1210 | 1378L | 01 | 48 | | CX | | 1 | 07 | | | 99 | 05 | 6 | 6 | | 07 | 3 | M | L |
| F | G | 0204 | 1205 | 1390D | 1198 | 1390A | 01 | 36 | W | CX | | 1 | 07 | | | 99 | 05 | 6 | 6 | | 07 | 3 | M | L |
| F | G | 0204 | 1205 | 1388D | 1198 | 1390A | 01 | 36 | W | CX | | 1 | 07 | | | 99 | 05 | 6 | 6 | | 09 | 3 | M | L |
| F | G | 0204 | 1211 | 1377D | 1204 | 1376A | 01 | 12 | W | CX | | 1 | 07 | | 04 | 99 | 05 | 6 | 6 | | 07 | 3 | M | L |
| F | G | 0204 | 1215 | 1373D | 1204 | 1375A | 02 | 36 | W | CX | | 2 | 10 | | | 99 | 05 | 6 | 6 | | 12 | 3 | M | L |
| F | G | 0204 | 1215 | 1373D | 1204 | 1375A | 02 | 36 | W | CX | | 2 | 10 | | | 99 | 05 | 6 | 6 | | 12 | 3 | M | L |
| D | G | 0205 | 1216 | 1285D | 1218 | 1285I | 01 | 03 | F | N | 20 | 7 | 08 | | | 99 | 05 | 6 | 6 | 01 | 04 | 3 | | Q |
| D | G | 0205 | 1226 | 1282D | 1229 | 1281I | 04 | 36 | W | N | 25 | 9 | 07 | | | 99 | 05 | 5 | 5 | 99 | 05 | 3 | | O |
| D | G | 0205 | 1226 | 1282D | 1229 | 1281I | 04 | 36 | W | N | 25 | 9 | 07 | | | 99 | 05 | 5 | 5 | 99 | 05 | 3 | | O |
| F | G | 0205 | 1229 | 1279D | 1223 | 1273A | 01 | 50 | W | C | | 1 | 07 | | | 99 | 05 | 6 | 6 | 99 | 07 | 3 | | R |
| D | G | 0205 | 1226 | 1282D | 1229 | 1281I | 04 | 36 | W | N | 25 | 9 | 07 | | | 99 | 05 | 5 | 5 | 99 | 05 | 3 | | O |
| D | G | 0205 | 1226 | 1282D | 1229 | 1281I | 04 | 36 | W | N | 25 | 9 | 07 | | | 99 | 05 | 5 | 5 | 99 | 05 | 3 | | O |
| D | G | 0205 | 1226 | 1286D | 1218 | 1282A | 01 | 12 | W | C | | 1 | 08 | | | 99 | 05 | 6 | 6 | 99 | 08 | 3 | | O |
| N | G | 0205 | 1226 | 1283D | 1219 | 1280A | 01 | 50 | W | C | | 1 | 07 | | | 99 | 05 | 5 | 6 | 99 | 07 | 3 | | O |
| C | G | 0205 | 1228 | 1280D | 1223 | 1273A | 01 | 50 | W | C | | 1 | 07 | | | 99 | 05 | 6 | 6 | 99 | 07 | 3 | | R |
| D | G | 0205 | 1226 | 1283D | 1218 | 1282A | 01 | 12 | W | C | | 2 | 08 | | | 99 | 05 | 5 | 6 | 99 | 10 | 3 | | O |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1229 | 1254A | 08 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1261B | 1234 | 1261F | 07 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1235 | 1258B | 1237 | 1256A | 02 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 04 | 3 | M | R |
| D | G | 0205 | 1235 | 1258B | 1237 | 1256A | 02 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 04 | 3 | M | R |
| D | G | 0205 | 1233 | 1261D | 1237 | 1260A | 01 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1237 | 1259D | 1232 | 1259A | 01 | 12 | NW | C | | 1 | 05 | | | 99 | 05 | 5 | 6 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1234 | 1261B | 1235 | 1261F | 04 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1234 | 1261B | 1235 | 1261F | 04 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1234 | 1261B | 1235 | 1261F | 04 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1234 | 1261B | 1235 | 1261F | 04 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | | 99 | 01 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1230 | 1255 | 02 | 12 | NE | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 06 | 3 | M | R |
| D | G | 0205 | 1234 | 1253D | 1230 | 1255 | 02 | 12 | NE | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 06 | 3 | M | R |
| D | G | 0205 | 1232 | 1258D | 1236 | 1255A | 02 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 06 | 3 | M | R |
| D | G | 0205 | 1232 | 1258D | 1236 | 1255A | 02 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 06 | 3 | M | R |
| D | G | 0205 | 1234 | 1260I | 1237 | 1259I | 01 | 50 | | C | | 2 | 05 | | | 99 | 05 | | | 99 | 03 | 3 | M | R |
| D | G | 0205 | 1234 | 1262B | 1237 | 1261F | 01 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | | | 99 | 03 | 3 | M | R |
| C | G | 0205 | 1232 | 1245D | 1234 | 1244A | 01 | 50 | SW | N | 04 | 2 | 07 | | 07 | 99 | 05 | 5 | 6 | 99 | 03 | 3 | M | R |
| C | G | 0205 | 1235 | 1262B | 1236 | 1262F | 02 | 50 | E | N | 02 | 2 | 05 | | | 99 | 05 | | | 99 | 03 | 3 | M | R |
| C | G | 0205 | 1235 | 1262B | 1236 | 1262F | 02 | 50 | E | N | 02 | 2 | 05 | | | 99 | 05 | | | 99 | 03 | 3 | M | R |
| G | G | 0205 | 1234 | 1253D | 1229 | 1256A | 02 | 50 | E | C | | 1 | 05 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| U | G | 0205 | 1234 | 1253D | 1229 | 1255A | 01 | 50 | W | C | | 1 | 06 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| D | G | 0205 | 1231 | 1258D | 1229 | 1255A | 02 | 00 | S | N | 20 | 7 | 05 | | | 99 | 05 | 6 | 8 | 01 | 04 | 3 | M | R |
| C | G | 0205 | 1235 | 1256B | 1233 | 1257F | 01 | 50 | NW | C | | 1 | 05 | | | 99 | 05 | | 6 | 99 | 02 | 3 | M | R |
| C | G | 0205 | 1231 | 1258D | 1236 | 1257A | 01 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 05 | 3 | M | R |
| C | G | 0205 | 1235 | 1261B | 1236 | 1261F | 01 | 50 | E | N | 02 | 2 | 05 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| C | G | 0205 | 1234 | 1262B | 1237 | 1261F | 01 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | | | 99 | 03 | 3 | M | R |
| C | G | 0205 | 1234 | 1261D | 1237 | 1260A | 01 | 50 | SE | C | | 1 | 05 | | | 99 | 05 | 6 | 5 | 99 | 05 | 3 | M | R |
| C | G | 0205 | 1234 | 1261B | 1236 | 1261F | 01 | 50 | SE | C | | 2 | 05 | | | 99 | 05 | 6 | | 99 | 02 | 3 | M | R |
| D | G | 0205 | 1231 | 1258D | 1229 | 1255A | 02 | 00 | S | N | 20 | 7 | 05 | | | 99 | 05 | 6 | 8 | 01 | 04 | 3 | M | R |
| U | G | 0205 | 1235 | 1262I | 1236 | 1263I | 02 | 50 | | N | 02 | 1 | 05 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| U | G | 0205 | 1235 | 1262I | 1236 | 1263I | 02 | 50 | | N | 02 | 1 | 05 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| G | G | 0205 | 1234 | 1253D | 1229 | 1256A | 02 | 50 | E | C | | 1 | 05 | | | 99 | 05 | 5 | 8 | 99 | 05 | 3 | M | R |
| E | G | 0205 | 1232 | 1245D | 1232 | 1243F | 01 | 36 | SW | N | 04 | 2 | 07 | | | 99 | 05 | 5 | | 99 | 03 | 3 | M | R |
| E | G | 0205 | 1235 | 1262B | 1235 | 1264F | 01 | 50 | N | C | | 2 | 05 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| U | A | 0207 | 1082 | 1485L | 1085 | 1487L | 03 | | | C | | 1 | 03 | | | 99 | | 0 | 4 | 24 | 03 | 3 | | C |
| U | A | 0207 | 1082 | 1485L | 1085 | 1487L | 03 | | | C | | 1 | 03 | | | 99 | | 0 | 4 | 24 | 03 | 3 | | C |
| U | A | 0207 | 1082 | 1485L | 1085 | 1487L | 03 | | | C | | 1 | 03 | | | 99 | | 0 | 4 | 24 | 03 | 3 | | C |
| C | A | 0207 | 1196 | 1216L | 1254 | 1207 | 01 | | | C | | 1 | 55 | | | 99 | | 4 | 6 | 48 | 56 | 3 | M | D |
| C | B | 0207 | 1208 | 1335B | 1207 | 1333F | 02 | 12 | S | C | | 1 | 09 | | | 99 | 05 | | 6 | 12 | 04 | 3 | M | P |
| C | B | 0207 | 1209 | 1333B | 1207 | 1331F | 01 | 60 | S | C | | 2 | 09 | | | 99 | 05 | | | 99 | 04 | 3 | M | P |
| C | B | 0207 | 1208 | 1335B | 1207 | 1333F | 02 | 12 | S | C | | 1 | 09 | | | 99 | 05 | | 6 | 12 | 04 | 3 | M | P |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | B | 0207 | 1209 | 1330B | 1211 | 1333F | 01 | 12 | N | C | | 1 | 10 | | | 99 | 05 | | | 12 | 05 | 3 | M | P |
| U | B | 0207 | 1209 | 1369L | 1211 | 1367I | 01 | 12 | | CX | | 1 | 05 | | | 99 | 05 | 7 | 6 | | 05 | 3 | M | L |
| E | B | 0207 | 1209 | 1369L | 1211 | 1368I | 01 | 12 | | CX | | 1 | 05 | | | 99 | 05 | 7 | 6 | | 05 | 3 | M | L |
| D | B | 0207 | 1207 | 1334B | 1208 | 1334F | 04 | 12 | S | N | 30 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 4 | 12 | 04 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1208 | 1334F | 04 | 12 | S | N | 30 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 4 | 12 | 04 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1208 | 1334F | 04 | 12 | S | N | 30 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 4 | 12 | 04 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1208 | 1334F | 04 | 12 | S | N | 30 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 4 | 12 | 04 | 3 | M | P |
| D | B | 0207 | 1205 | 1336B | 1204 | 1333F | 02 | 60 | S | C | | 1 | 09 | 30 | 30 | 99 | 05 | | 6 | 99 | 05 | 3 | M | P |
| D | B | 0207 | 1205 | 1336B | 1204 | 1333F | 02 | 60 | S | C | | 1 | 09 | 30 | 30 | 99 | 05 | | 6 | 99 | 05 | 3 | M | P |
| D | B | 0207 | 1206 | 1337B | 1203 | 1333F | 03 | 60 | S | C | | 2 | 09 | 30 | | 99 | 05 | | | 99 | 06 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1206 | 1333F | 03 | 60 | S | C | | 1 | 09 | 30 | | 99 | 05 | 4 | 6 | 99 | 04 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1206 | 1333F | 03 | 60 | S | C | | 1 | 09 | 30 | | 99 | 05 | 4 | 6 | 99 | 04 | 3 | M | P |
| D | B | 0207 | 1207 | 1334B | 1206 | 1333F | 03 | 60 | S | C | | 1 | 09 | 30 | | 99 | 05 | 4 | 6 | 99 | 04 | 3 | M | P |
| D | B | 0207 | 1206 | 1337B | 1203 | 1333F | 03 | 60 | S | C | | 2 | 09 | 30 | | 99 | 05 | | | 99 | 06 | 3 | M | P |
| D | B | 0207 | 1206 | 1337B | 1203 | 1333F | 03 | 60 | S | C | | 2 | 09 | 30 | | 99 | 05 | | | 99 | 06 | 3 | M | P |
| D | B | 0207 | 1206 | 1337B | 1203 | 1332F | 02 | 60 | S | C | | 2 | 09 | 30 | | 99 | 05 | | 6 | 99 | 06 | 3 | M | P |
| D | B | 0207 | 1206 | 1337B | 1203 | 1332F | 02 | 60 | S | C | | 2 | 09 | 30 | | 99 | 05 | | 6 | 99 | 06 | 3 | M | P |
| D | B | 0207 | 1215 | 1335D | 1223 | 1332F | 03 | 60 | SF | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 08 | 3 | M | K |
| D | B | 0207 | 1215 | 1335D | 1223 | 1332F | 03 | 60 | SF | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 08 | 3 | M | K |
| D | B | 0207 | 1217 | 1332I | 1215 | 1335L | 03 | 60 | | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 03 | 3 | M | K |
| D | B | 0207 | 1217 | 1332I | 1215 | 1335L | 03 | 60 | | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 03 | 3 | M | K |
| D | B | 0207 | 1217 | 1332I | 1215 | 1335L | 03 | 60 | | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 03 | 3 | M | K |
| D | B | 0207 | 1213 | 1334D | 1220 | 1331F | 03 | 36 | SF | CX | | 2 | 08 | 30 | | 99 | 05 | 4 | 8 | | 07 | 3 | M | K |
| D | B | 0207 | 1213 | 1334D | 1220 | 1331F | 03 | 36 | SF | CX | | 2 | 08 | 30 | | 99 | 05 | 4 | 8 | | 07 | 3 | M | K |
| D | B | 0207 | 1213 | 1334D | 1220 | 1331F | 03 | 36 | SF | CX | | 2 | 08 | 30 | | 99 | 05 | 4 | 8 | | 07 | 3 | M | K |
| D | B | 0207 | 1215 | 1335D | 1223 | 1332F | 03 | 60 | SF | CX | | 1 | 08 | 30 | | 99 | 05 | 4 | 8 | | 08 | 3 | M | K |
| D | B | 0207 | 1210 | 1335B | 1205 | 1336F | 04 | 12 | S | N | 35 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 6 | 12 | 07 | 3 | M | P |
| D | B | 0207 | 1210 | 1335B | 1205 | 1336F | 04 | 12 | S | N | 35 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 6 | 12 | 07 | 3 | M | P |
| D | B | 0207 | 1210 | 1335B | 1205 | 1336F | 04 | 12 | S | N | 35 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 6 | 12 | 07 | 3 | M | P |
| D | B | 0207 | 1210 | 1335B | 1205 | 1336F | 04 | 12 | S | N | 35 | 7 | 09 | 30 | 30 | 99 | 05 | 4 | 6 | 12 | 07 | 3 | M | P |
| E | B | 0207 | 1215 | 1361D | 1209 | 1363A | 01 | 12 | NW | CX | | 1 | 04 | | 04 | 99 | 05 | 6 | 6 | | 04 | 3 | M | L |
| E | B | 0207 | 1218 | 1331B | 1216 | 1332F | 01 | 12 | NW | CX | | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | K |
| E | B | 0207 | 1213 | 1332B | 1213 | 1330F | 01 | 36 | SF | C | | 1 | 08 | | | 99 | 04 | | | | 04 | 3 | M | P |
| E | B | 0207 | 1216 | 1333B | 1216 | 1334F | 01 | 12 | N | CX | | 1 | 08 | 30 | | 99 | 05 | | | | 02 | 3 | M | K |
| U | B | 0207 | 1214 | 1363D | 1209 | 1363A | 01 | 12 | | CX | | 1 | 04 | | 04 | 99 | 05 | 6 | 6 | | 04 | 3 | M | L |
| G | B | 0207 | 1210 | 1332B | 1209 | 1332F | 02 | 24 | S | N | 35 | 7 | 10 | | | 99 | 05 | | | 24 | 04 | 3 | M | P |
| G | B | 0207 | 1213 | 1332B | 1213 | 1330F | 01 | 48 | SF | N | 50 | 7 | 08 | | | 99 | 05 | | | | 02 | 3 | M | P |
| G | B | 0207 | 1215 | 1332B | 1215 | 1330F | 01 | 48 | NW | P | | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | P |
| G | B | 0207 | 1215 | 1332B | 1215 | 1330F | 01 | 48 | NW | P | | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | P |
| G | B | 0207 | 1210 | 1332B | 1209 | 1332F | 02 | 24 | S | N | 35 | 7 | 10 | | | 99 | 05 | | | 24 | 04 | 3 | M | P |
| G | B | 0207 | 1215 | 1333F | 1216 | 1334I | 01 | 60 | | PX | | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | K |
| G | B | 0207 | 1211 | 1331B | 1210 | 1330F | 01 | 24 | S | N | 30 | 7 | 10 | | | 99 | 05 | | | 99 | 04 | 3 | M | P |
| G | B | 0207 | 1212 | 1332B | 1212 | 1330F | 01 | 60 | SF | PX | 50 | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | P |
| G | B | 0207 | 1221 | 1334B | 1221 | 1335F | 01 | 48 | N | PX | | 1 | 08 | | | 99 | 05 | | | | 02 | 3 | M | K |
| G | B | 0207 | 1222 | 1339B | 1224 | 1339F | 02 | 24 | F | NX | 50 | 7 | 12 | | | 99 | 05 | 0 | 0 | | 10 | 3 | M | K |
| G | B | 0207 | 1222 | 1339B | 1224 | 1339F | 02 | 24 | F | NX | 50 | 7 | 12 | | | 99 | 05 | 0 | 0 | | 10 | 3 | M | K |
| U | A | 0207 | 1220 | 1233I | 1230 | 1233I | 01 | | | C | | 1 | 35 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1234I | 1230 | 1234I | 02 | | | C | | 1 | 32 | | | 99 | | | | 48 | 10 | 3 | | S |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | A | 0207 | 1220 | 1234I | 1230 | 1234I | 02 | | | C | | 1 | 32 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1235I | 1230 | 1235I | 01 | | | C | | 1 | 30 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1236I | 1230 | 1236I | 02 | | | C | | 1 | 28 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1236I | 1230 | 1236I | 02 | | | C | | 1 | 28 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1237I | 1230 | 1237I | 01 | | | C | | 1 | 25 | | | 99 | | | | 48 | 10 | 3 | | S |
| U | A | 0207 | 1220 | 1238I | 1237 | 1238I | 02 | | | C | | 1 | 17 | | | 99 | | | | 48 | 15 | 3 | | S |
| U | A | 0207 | 1220 | 1238I | 1237 | 1238I | 02 | | | C | | 1 | 17 | | | 99 | | | | 48 | 15 | 3 | | S |
| E | B | 0207 | 1229 | 1245B | 1231 | 1245E | 01 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| E | B | 0207 | 1222 | 1335B | 1222 | 1333E | 02 | 12 | S | CX | | 1 | 08 | | | 99 | 05 | | | | 03 | 3 | M | K |
| E | B | 0207 | 1222 | 1335B | 1222 | 1333E | 02 | 12 | S | CX | | 1 | 08 | | | 99 | 05 | | | | 03 | 3 | M | K |
| C | B | 0207 | 1229 | 1247B | 1231 | 1247E | 02 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1229 | 1247B | 1231 | 1247E | 02 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1229 | 1246B | 1231 | 1246E | 01 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1229 | 1246B | 1231 | 1246E | 01 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1229 | 1245B | 1231 | 1246E | 01 | 36 | NE | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| D | B | 0207 | 1224 | 1330D | 1213 | 1334A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 11 | 3 | M | K |
| D | B | 0207 | 1224 | 1330D | 1213 | 1334A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 11 | 3 | M | K |
| D | B | 0207 | 1224 | 1330D | 1213 | 1334A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 11 | 3 | M | K |
| D | B | 0207 | 1224 | 1330D | 1213 | 1334A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 11 | 3 | M | K |
| D | B | 0207 | 1225 | 1335B | 1217 | 1336A | 03 | 36 | NW | CX | | 2 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1225 | 1335B | 1217 | 1336A | 03 | 36 | NW | CX | | 2 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1225 | 1335B | 1217 | 1336A | 03 | 36 | NW | CX | | 2 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
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| D | B | 0207 | 1224 | 1330D | 1213 | 1334A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 11 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | B | 0207 | 1223 | 1332B | 1215 | 1335A | 06 | 24 | NW | CX | | 1 | 08 | | 30 | 99 | 05 | B | 4 | | 08 | 3 | M | K |
| D | G | 0207 | 1233 | 1262D | 1237 | 1266A | 01 | 0 | NE | C | | 8 | 05 | | 30 | 99 | 05 | C | 4 | 24 | 07 | 3 | M | R |
| C | B | 0207 | 1230 | 1247B | 1231 | 1247E | 01 | 36 | E | C | | 1 | 12 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1231 | 1248B | 1230 | 1248E | 02 | 36 | W | C | | 1 | 10 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1231 | 1248B | 1230 | 1248E | 02 | 36 | W | C | | 1 | 10 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| C | B | 0207 | 1231 | 1243B | 1228 | 1244E | 04 | 36 | W | C | | 1 | 12 | | | 99 | 05 | | | 12 | 03 | 3 | M | R |
| C | B | 0207 | 1231 | 1243B | 1228 | 1244E | 04 | 36 | W | C | | 1 | 12 | | | 99 | 05 | | | 12 | 03 | 3 | M | R |
| C | B | 0207 | 1231 | 1243B | 1228 | 1244E | 04 | 36 | W | C | | 1 | 12 | | | 99 | 05 | | | 12 | 03 | 3 | M | R |
| C | B | 0207 | 1231 | 1243B | 1228 | 1244E | 04 | 36 | W | C | | 1 | 12 | | | 99 | 05 | | | 12 | 03 | 3 | M | R |
| N | B | 0207 | 1231 | 1242I | 1227 | 1241I | 02 | 60 | | C | | 1 | 12 | | | 99 | 05 | | | 99 | 05 | 3 | M | S |
| N | B | 0207 | 1231 | 1242I | 1227 | 1241I | 02 | 60 | | C | | 1 | 12 | | | 99 | 05 | | | 99 | 05 | 3 | M | S |
| E | B | 0207 | 1232 | 1248I | 1229 | 1249I | 01 | 60 | | C | | 1 | 10 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| E | B | 0207 | 1232 | 1248B | 1230 | 1248E | 01 | 12 | W | C | | 1 | 10 | | | 99 | 05 | | | 36 | 02 | 3 | M | R |
| E | B | 0207 | 1231 | 1248B | 1230 | 1248E | 01 | 13 | W | C | | 1 | 10 | | | 99 | 05 | | | 12 | 02 | 3 | M | R |
| E | B | 0207 | 1230 | 1247I | 1231 | 1247E | 01 | 60 | | C | | 1 | 12 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| N | B | 0207 | 1231 | 1245B | 1229 | 1245E | 02 | 60 | W | C | | 1 | 12 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| N | B | 0207 | 1231 | 1245B | 1229 | 1245E | 02 | 60 | W | C | | 1 | 12 | | | 99 | 05 | | | 99 | 02 | 3 | M | R |
| U | A | 0207 | 1238 | 1179I | 1244 | 1179E | 01 | | | C | | 1 | 40 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1242 | 1175I | 1246 | 1178I | 02 | | | C | | 1 | 45 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1245 | 1170 | 1250 | 1173 | 01 | | | C | | 1 | 50 | | | 99 | | | | 48 | 03 | 3 | | D |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | A | 0207 | 1242 | 1175I | 1246 | 1178I | 02 | | | C | | 1 | 45 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1287 | 1141I | 1302 | 1141I | 01 | | | C | | 1 | 40 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1294 | 1136I | 1303 | 1136I | 02 | | | C | | 1 | 37 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1294 | 1136I | 1303 | 1136I | 02 | | | C | | 1 | 37 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1300 | 1130 | 1310 | 1130 | 01 | | | C | | 1 | 35 | | | 99 | | | | 48 | 03 | 3 | | D |
| U | A | 0207 | 1309 | 1096I | 1303 | 1096I | 01 | | | C | | 1 | 60 | | | 99 | | | | 99 | 03 | 3 | | E |
| U | A | 0207 | 1302 | 1098I | 1314 | 1098I | 01 | | | C | | 1 | 55 | | | 99 | | | | 99 | 03 | 3 | | E |
| U | A | 0207 | 1303 | 1103I | 1313 | 1103I | 02 | | | C | | 1 | 50 | | | 99 | | | | 99 | 03 | 3 | | E |
| U | A | 0207 | 1303 | 1103I | 1313 | 1103I | 02 | | | C | | 1 | 50 | | | 99 | | | | 99 | 03 | 3 | | E |
| C | M | 0209 | 1187 | 1342D | 1184 | 1340E | 02 | 60 | SW | P | 25 | 2 | 05 | 04 | | 99 | 05 | 6 | | 12 | 03 | 3 | M | P |
| C | M | 0209 | 1187 | 1342D | 1184 | 1340E | 02 | 60 | SW | P | 25 | 2 | 05 | 04 | | 99 | 05 | 6 | | 12 | 03 | 3 | M | P |
| C | M | 0209 | 1186 | 1338B | 1187 | 1342A | 03 | 60 | N | C | | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | 12 | 04 | 3 | M | P |
| C | M | 0209 | 1186 | 1338B | 1187 | 1342A | 03 | 60 | N | C | | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | 12 | 04 | 3 | M | P |
| C | M | 0209 | 1186 | 1338B | 1187 | 1342A | 03 | 60 | N | C | | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | 12 | 04 | 3 | M | P |
| C | G | 0209 | 1190 | 1335D | 1190 | 1341A | 02 | 48 | N | C | | 2 | 05 | | 04 | 99 | 05 | 6 | 6 | 22 | 06 | 3 | M | P |
| C | G | 0209 | 1190 | 1335D | 1190 | 1341A | 02 | 48 | N | C | | 2 | 05 | | 04 | 99 | 05 | 6 | 6 | 22 | 06 | 3 | M | P |
| C | G | 0209 | 1192 | 1336D | 1194 | 1338E | 02 | 48 | NE | C | | 1 | 07 | | | 99 | 05 | 6 | | 24 | 03 | 3 | M | P |
| C | G | 0209 | 1192 | 1336D | 1194 | 1338E | 02 | 48 | NE | C | | 1 | 07 | | | 99 | 05 | 6 | | 24 | 03 | 3 | M | P |
| E | G | 0209 | 1198 | 1334D | 1202 | 1336E | 01 | 48 | SW | C | | 1 | 09 | | 05 | 99 | 05 | | 8 | 24 | 05 | 3 | M | P |
| D | G | 0209 | 1192 | 1340D | 1192 | 1340A | 02 | 48 | S | N | 25 | 7 | 05 | | | 99 | 05 | 6 | 6 | 24 | 05 | 3 | M | P |
| D | G | 0209 | 1192 | 1340D | 1192 | 1340A | 02 | 48 | S | N | 25 | 7 | 05 | | | 99 | 05 | 6 | 6 | 24 | 05 | 3 | M | P |
| D | G | 0209 | 1209 | 1363 | | | 04 | 36 | W | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| D | G | 0209 | 1209 | 1363 | | | 04 | 36 | W | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| D | G | 0209 | 1209 | 1363 | | | 04 | 36 | W | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| D | G | 0209 | 1209 | 1363 | | | 04 | 36 | W | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| E | G | 0209 | 1204 | 1372D | 1210 | 1372I | 02 | 36 | E | CX | | 1 | 08 | 04 | | 99 | 05 | 7 | 6 | | 08 | 3 | M | L |
| E | G | 0209 | 1204 | 1372D | 1210 | 1372I | 02 | 36 | E | CX | | 1 | 08 | 04 | | 99 | 05 | 7 | 6 | | 08 | 3 | M | L |
| E | G | 0209 | 1209 | 1364D | 1211 | 1362I | 02 | 36 | S | PX | 05 | 2 | 05 | 04 | | 99 | 05 | 6 | | | 02 | 3 | M | L |
| E | G | 0209 | 1209 | 1364D | 1211 | 1362I | 02 | 36 | S | PX | 05 | 2 | 05 | 04 | | 99 | 05 | 6 | | | 02 | 3 | M | L |
| C | G | 0209 | 1200 | 1336B | 1199 | 1334E | 02 | 48 | S | C | | 1 | 07 | | | 99 | 05 | 6 | | 24 | 04 | 3 | M | P |
| C | G | 0209 | 1200 | 1336B | 1199 | 1334E | 02 | 48 | S | C | | 1 | 07 | | | 99 | 05 | 6 | | 24 | 04 | 3 | M | P |
| D | G | 0209 | 1208 | 1365D | 1209 | 1364A | 02 | 36 | S | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | 01 | 3 | M | L |
| D | G | 0209 | 1208 | 1365D | 1209 | 1364A | 02 | 36 | S | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | 01 | 3 | M | L |
| G | G | 0209 | 1204 | 1372D | 1211 | 1370I | 01 | 12 | E | CX | | 2 | 07 | 04 | | 99 | 05 | | | | 08 | 3 | M | L |
| C | G | 0209 | 1209 | 1363 | | | 01 | 36 | | NX | 03 | 7 | 05 | 04 | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| C | G | 0209 | 1205 | 1371D | 1211 | 1369I | 01 | 48 | SE | CX | | 1 | 07 | 04 | | 99 | 05 | 6 | 6 | | 08 | 3 | M | L |
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| C | G | 0209 | 1207 | 1370D | 1210 | 1375I | 01 | 12 | NE | CX | | 1 | 08 | 04 | | 99 | 05 | 7 | | | 08 | 3 | M | L |
| D | G | 0209 | 1202 | 1330D | 1205 | 1335E | 01 | 36 | NE | C | | 1 | 09 | 05 | | 99 | 05 | 8 | | 24 | 05 | 3 | M | P |
| C | G | 0209 | 1212 | 1367I | 1209 | 1367A | 01 | 36 | W | CX | | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | | 05 | 3 | M | L |
| C | G | 0209 | 1211 | 1362I | 1209 | 1362A | 01 | 36 | NW | PX | 05 | 1 | 05 | | 04 | 99 | 05 | | 6 | | 01 | 3 | M | L |
| G | G | 0209 | 1214 | 1359I | 1212 | 1359A | 01 | 12 | W | PX | 03 | 1 | 05 | | 04 | 99 | 05 | | 6 | | 01 | 3 | M | L |
| E | G | 0209 | 1216 | 1355I | 1214 | 1355A | 01 | 12 | W | PX | 05 | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | | 01 | 3 | M | L |
| E | G | 0209 | 1214 | 1356I | 1212 | 1357A | 01 | 12 | W | PX | 04 | 1 | 05 | | 04 | 99 | 05 | 6 | 6 | | 01 | 3 | M | L |
| E | G | 0209 | 1211 | 1361I | 1209 | 1362A | 01 | 12 | NW | PX | 03 | 1 | 05 | | 04 | 99 | 05 | | 6 | | 01 | 3 | M | L |
| D | G | 0209 | 1213 | 1357 | | | 02 | 48 | | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| D | G | 0209 | 1213 | 1357 | | | 02 | 48 | | NX | 03 | 9 | 05 | | | 99 | 05 | 6 | 6 | | | 3 | M | L |
| U | A | 0212 | 1127 | 1426L | 1123 | 1424I | 02 | | | P | 80 | 1 | 17 | | | 24 | | | | 99 | 08 | 3 | M | C |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | A | 0212 | 1127 | 1426L | 1123 | 1424I | 02 | | | P | 80 | 1 | 17 | | | 24 | | | | 99 | 08 | 3 | M | C |
| U | A | 0212 | 1128 | 1421L | 1119 | 1402I | 01 | | | C | | 1 | 18 | | | 24 | | | | 99 | 18 | 3 | M | C |
| U | A | 0212 | 1167 | 1338L | 1167 | 1347I | 01 | | | P | 99 | 1 | 15 | | | 26 | 06 | | | 99 | 09 | 3 | M | C |
| D | A | 0212 | 1164 | 1382L | 1149 | 1382I | 01 | | | P | 99 | 1 | 35 | | | 26 | | | | 99 | 15 | 3 | M | C |
| U | A | 0212 | 1164 | 1268L | 1171 | 1272L | 01 | | | CX | | 1 | 05 | | | 26 | 06 | | | | 05 | 3 | M | H |
| U | A | 0212 | 1172 | 1256L | 1177 | 1256L | 01 | | | CX | | 1 | 05 | | | 26 | 06 | | | | 05 | 3 | M | H |
| U | A | 0212 | 1172 | 1254L | 1177 | 1254L | 01 | | | CX | | 1 | 05 | | | 26 | 06 | | | | 05 | 3 | M | H |
| U | A | 0212 | 1174 | 1245I | 1174 | 1252I | 01 | | | CX | | 1 | 50 | | | 26 | | | | | 07 | 3 | M | H |
| U | A | 0212 | 1177 | 1494L | 1190 | 1490I | 01 | | | PX | 75 | 1 | 45 | | | 26 | 06 | | | | 15 | 3 | M | M |
| U | A | 0212 | 1184 | 1408L | 1199 | 1397I | 01 | | | PX | 99 | 1 | 24 | | | 26 | 06 | | | | 17 | 3 | M | L |
| U | A | 0212 | 1180 | 1346L | 1183 | 1343I | 01 | | | P | 38 | 2 | 08 | | | 26 | | | | 99 | 08 | 3 | M | P |
| U | A | 0212 | 1194 | 1342L | 1193 | 1335L | 03 | | | C | | 1 | 07 | | | 26 | | | | 99 | 07 | 3 | M | P |
| U | A | 0212 | 1194 | 1342L | 1193 | 1335L | 03 | | | C | | 1 | 07 | | | 26 | | | | 99 | 07 | 3 | M | P |
| U | A | 0212 | 1194 | 1342L | 1193 | 1335L | 03 | | | C | | 1 | 07 | | | 26 | | | | 99 | 07 | 3 | M | P |
| U | A | 0212 | 1191 | 1340L | 1191 | 1334L | 01 | | | C | | 1 | 06 | | | 26 | | 6 | 6 | 99 | 06 | 3 | M | P |
| U | A | 0212 | 1210 | 1362L | 1215 | 1362 | 01 | | | CX | | 1 | 05 | | | 26 | 06 | | | | 05 | 3 | M | L |
| U | A | 0212 | 1210 | 1336L | 1204 | 1328L | 01 | | | C | | 1 | 09 | | | 26 | | | | 99 | 09 | 3 | M | P |
| U | A | 0212 | 1218 | 1349L | 1223 | 1353I | 01 | | | CX | | 1 | 07 | | | 26 | 06 | | | | 07 | 3 | M | L |
| U | A | 0212 | 1222 | 1337L | 1224 | 1330L | 01 | | | CX | | 1 | 08 | | | 26 | 06 | | | | 08 | 3 | M | K |
| E | B | 0212 | 1224 | 1245D | 1233 | 1243F | 01 | 12 | SE | C | | 1 | 09 | | | 26 | 06 | 8 | 8 | 99 | 09 | 3 | M | S |
| U | A | 0212 | 1220 | 1278L | 1228 | 1280L | 01 | | | C | | 1 | 08 | | | 26 | | | | 99 | 08 | 3 | M | O |
| D | B | 0212 | 1220 | 1278D | 1229 | 1279A | 02 | 12 | E | C | | 1 | 08 | | | 26 | 06 | 6 | 5 | 99 | 08 | 3 | M | R |
| D | B | 0212 | 1220 | 1278D | 1229 | 1279A | 02 | 12 | E | C | | 1 | 08 | | | 26 | 06 | 6 | 5 | 99 | 08 | 3 | M | R |
| D | B | 0212 | 1229 | 1279D | 1220 | 1278A | 02 | 12 | W | C | | 1 | 08 | | | 26 | 06 | 5 | 6 | 99 | 08 | 3 | M | R |
| D | B | 0212 | 1229 | 1279D | 1220 | 1278A | 02 | 12 | W | C | | 1 | 08 | | | 26 | 06 | 5 | 6 | 99 | 08 | 3 | M | R |
| D | B | 0212 | 1229 | 1254D | 1234 | 1255A | 03 | 12 | E | C | | 2 | 05 | | | 26 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | B | 0212 | 1229 | 1254D | 1234 | 1255A | 03 | 12 | E | C | | 2 | 05 | | | 26 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | B | 0212 | 1229 | 1254D | 1234 | 1255A | 03 | 12 | E | C | | 2 | 05 | | | 26 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | B | 0212 | 1234 | 1255D | 1229 | 1254A | 03 | 12 | W | C | | 2 | 05 | | | 26 | 06 | 5 | 6 | 99 | 05 | 3 | M | R |
| D | B | 0212 | 1234 | 1255D | 1229 | 1254A | 03 | 12 | W | C | | 2 | 05 | | | 26 | 06 | 5 | 6 | 99 | 05 | 3 | M | R |
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| U | A | 0212 | 1231 | 1266L | 1235 | 1269L | 02 | | | C | | 1 | 05 | | | 26 | 06 | | | 99 | 05 | 3 | M | R |
| U | A | 0212 | 1231 | 1266L | 1235 | 1269L | 02 | | | C | | 1 | 05 | | | 26 | 06 | | | 99 | 05 | 3 | M | R |
| G | B | 0212 | 1237 | 1259D | 1237 | 1259A | 01 | 24 | N | N | 25 | 9 | 05 | | | 26 | 06 | 5 | 5 | 99 | 05 | 3 | M | R |
| C | B | 0212 | 1234 | 1253D | 1231 | 1258A | 02 | 12 | NW | C | | 1 | 05 | | | 26 | 06 | 5 | 6 | 99 | 06 | 3 | M | R |
| C | B | 0212 | 1230 | 1246B | 1233 | 1245A | 02 | 24 | SE | P | 35 | 1 | 09 | | 05 | 26 | 06 | | 6 | 99 | 04 | 3 | M | R |
| C | B | 0212 | 1230 | 1246B | 1233 | 1245A | 02 | 24 | SE | P | 35 | 1 | 09 | | 05 | 26 | 06 | | 6 | 99 | 04 | 3 | M | R |
| C | B | 0212 | 1234 | 1253D | 1231 | 1258A | 02 | 12 | NW | C | | 1 | 05 | | | 26 | 06 | 5 | 6 | 99 | 06 | 3 | M | R |
| U | A | 0212 | 1315 | 1123L | 1275 | 1108I | 01 | | | C | | 1 | 22 | | | 26 | | | | 99 | 50 | 3 | M | D |
| U | A | 0212 | 1313 | 1085L | 1301 | 1095I | 01 | | | C | | 2 | 40 | | | 26 | | | | 99 | 12 | 3 | M | D |
| U | A | 0212 | 1315 | 1080L | 1321 | 1383I | 01 | | | CX | 75 | 1 | 15 | | | 26 | | | | | 07 | 3 | M | G |
| U | A | 0212 | 1325 | 1081L | 1315 | 1081I | 01 | | | CX | 75 | 1 | 15 | | | 26 | | | | | 13 | 3 | M | G |
| U | A | 0212 | 1320 | 1102I | 1302 | 1102I | 01 | | | C | | 1 | 62 | | | 26 | | | | 99 | 18 | 3 | M | D |
| D | B | 0212 | 1327 | 1269D | 1233 | 1271A | 03 | 24 | NE | C | | 1 | 07 | | | 26 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | B | 0212 | 1327 | 1269D | 1233 | 1271A | 03 | 24 | NE | C | | 1 | 07 | | | 26 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | B | 0212 | 1327 | 1269D | 1233 | 1271A | 03 | 24 | NE | C | | 1 | 07 | | | 26 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | G | 0213 | 1225 | 1272D | 1229 | 1278A | 01 | 12 | NE | C | | 1 | 07 | | | 25 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | G | 0213 | 1229 | 1278D | 1225 | 1272A | 01 | 00 | SW | C | | 1 | 07 | | | 25 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | G | 0213 | 1227 | 1281D | 1220 | 1279A | 03 | 12 | SW | C | | 1 | 08 | | | 26 | 06 | 5 | 5 | 99 | 08 | 3 | M | O |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | G | 0213 | 1227 | 1281D | 1220 | 1279A | 03 | 12 | SW | C | | 1 | 08 | | | 26 | 06 | 5 | 5 | 99 | 08 | 3 | M | O |
| D | G | 0213 | 1227 | 1281D | 1220 | 1279A | 03 | 12 | SW | C | | 1 | 08 | | | 26 | 06 | 5 | 5 | 99 | 08 | 3 | M | O |
| D | G | 0213 | 1220 | 1279D | 1227 | 1281A | 02 | 08 | NE | C | | 1 | 08 | | | 26 | 06 | 5 | 5 | 99 | 08 | 3 | M | O |
| D | G | 0213 | 1220 | 1279D | 1227 | 1281A | 02 | 08 | NE | C | | 1 | 08 | | | 26 | 06 | 5 | 5 | 99 | 08 | 3 | M | O |
| C | G | 0213 | 1228 | 1279D | 1224 | 1273A | 01 | 12 | W | C | | 1 | 08 | | | 25 | 06 | 5 | 5 | 99 | 08 | 3 | M | R |
| C | G | 0213 | 1222 | 1273D | 1224 | 1276I | 01 | 12 | NE | C | | 1 | 08 | | | 25 | 06 | | | 99 | 04 | 3 | M | R |
| E | G | 0213 | 1225 | 1275B | 1228 | 1275I | 01 | 12 | E | C | | 1 | 08 | | | 25 | 06 | | | 99 | 04 | 3 | M | R |
| E | G | 0213 | 1229 | 1278D | 1225 | 1272A | 01 | 18 | SW | C | | 1 | 07 | | | 25 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| E | G | 0213 | 1233 | 1267B | 1234 | 1269A | 01 | 12 | NE | C | | 1 | 05 | | | 24 | 06 | | 5 | 99 | 03 | 3 | M | R |
| E | G | 0213 | 1237 | 1260D | 1235 | 1260I | 01 | 12 | W | P | 20 | 1 | 04 | | | 24 | 06 | 5 | | 99 | 02 | 3 | M | R |
| D | G | 0213 | 1231 | 1376D | 1226 | 1270 | 01 | 12 | SW | C | | 1 | 07 | | | 24 | 06 | 5 | 5 | 99 | 07 | 3 | M | R |
| D | G | 0213 | 1236 | 1258D | 1231 | 1258A | 03 | 24 | W | C | | 1 | 05 | | | 24 | 06 | 5 | 6 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1236 | 1258D | 1231 | 1258A | 03 | 24 | W | C | | 1 | 05 | | | 24 | 06 | 5 | 6 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1236 | 1258D | 1231 | 1258A | 03 | 24 | W | C | | 1 | 05 | | | 24 | 06 | 5 | 6 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1233 | 1265D | 1235 | 1269A | 01 | 06 | NE | C | | 1 | 05 | | | 24 | 06 | 5 | C | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1234 | 1261D | 1236 | 1258A | 04 | 24 | SE | C | | 2 | 04 | | | 24 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1234 | 1261D | 1236 | 1258A | 04 | 24 | SE | C | | 2 | 04 | | | 24 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1234 | 1261D | 1236 | 1258A | 04 | 24 | SE | C | | 2 | 04 | | | 24 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| D | G | 0213 | 1234 | 1261D | 1236 | 1258A | 04 | 24 | SE | C | | 2 | 04 | | | 24 | 06 | 6 | 5 | 99 | 05 | 3 | M | R |
| U | A | 0222 | 1125 | 1418I | 1127 | 1415I | 01 | | | N | 15 | 1 | 18 | | | 60 | | | | 48 | 03 | 4 | D | C |
| N | A | 0222 | 1138 | 1342L | 1147 | 1336L | 02 | | | CX | | 1 | 08 | | | 60 | | 4 | 8 | | 12 | 4 | D | J |
| N | A | 0222 | 1138 | 1342L | 1147 | 1336L | 02 | | | CX | | 1 | 08 | | | 60 | | 4 | 8 | | 12 | 4 | D | J |
| U | A | 0222 | 1198 | 1335I | 1199 | 1338I | 01 | | | P | 40 | 1 | 07 | | | 60 | | 6 | | 48 | 04 | 4 | D | P |
| U | A | 0222 | 1201 | 1380L | 1208 | 1378L | 02 | | | CX | | 1 | 07 | | | 60 | | 6 | 7 | | 08 | 4 | D | L |
| U | A | 0222 | 1201 | 1380L | 1208 | 1378L | 02 | | | CX | | 1 | 07 | | | 60 | | 6 | 7 | | 08 | 4 | D | L |
| U | A | 0222 | 1212 | 1307L | 1225 | 1312C | 01 | | | C | | 2 | 14 | | | 60 | 10 | | 6 | 48 | 16 | 4 | D | O |
| U | A | 0222 | 1213 | 1357L | 1217 | 1358L | 01 | | | CX | | 1 | 04 | | | 60 | | 6 | 7 | | 04 | 4 | D | L |
| N | A | 0222 | 1214 | 1332I | 1216 | 1335I | 01 | | | PX | 50 | 1 | 10 | | | 60 | | | | 48 | 04 | 4 | D | K |
| C | B | 0222 | 1229 | 1248D | 1233 | 1249A | 02 | 36 | E | C | | 2 | 06 | | 05 | 60 | 08 | 9 | 5 | 12 | 06 | 4 | D | R |
| C | B | 0222 | 1229 | 1248D | 1233 | 1249A | 02 | 36 | E | C | | 2 | 06 | | 05 | 60 | 08 | 9 | 5 | 12 | 06 | 4 | D | R |
| U | A | 0222 | 1225 | 1235I | 1230 | 1235I | 02 | | | C | | 1 | 30 | | | 60 | 08 | | | 48 | 05 | 4 | D | S |
| U | A | 0222 | 1225 | 1235I | 1230 | 1235I | 02 | | | C | | 1 | 30 | | | 60 | 08 | | | 48 | 05 | 4 | D | S |
| U | A | 0222 | 1220 | 1280I | 1222 | 1281I | 02 | | | P | 40 | 1 | 08 | | | 60 | 10 | | | 48 | 01 | 4 | D | O |
| U | A | 0222 | 1220 | 1280I | 1222 | 1281I | 02 | | | P | 40 | 1 | 08 | | | 60 | 10 | | | 48 | 01 | 4 | D | O |
| D | B | 0222 | 1229 | 1269D | 1233 | 1271A | 03 | 60 | E | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1229 | 1269D | 1233 | 1271A | 03 | 60 | E | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1229 | 1269D | 1233 | 1271A | 03 | 60 | E | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1233 | 1271D | 1229 | 1269A | 03 | 50 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1230 | 1268D | 1233 | 1270A | 03 | 60 | E | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1230 | 1268D | 1233 | 1270A | 03 | 60 | E | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1233 | 1271D | 1229 | 1269A | 03 | 50 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1233 | 1271D | 1229 | 1269A | 03 | 50 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 99 | 05 | 4 | D | R |
| C | B | 0222 | 1232 | 1244B | 1225 | 1240E | 02 | 36 | W | C | | 2 | 16 | | | 60 | 08 | 5 | | 12 | 10 | 4 | D | S |
| C | B | 0222 | 1232 | 1244B | 1225 | 1240E | 02 | 36 | W | C | | 2 | 16 | | | 60 | 08 | 5 | | 12 | 10 | 4 | D | S |
| D | B | 0222 | 1233 | 1271D | 1230 | 1268A | 04 | 12 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 36 | 05 | 4 | D | R |
| D | B | 0222 | 1233 | 1271D | 1230 | 1268A | 04 | 12 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 36 | 05 | 4 | D | R |
| D | B | 0222 | 1233 | 1271D | 1230 | 1268A | 04 | 12 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 36 | 05 | 4 | D | R |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | B | 0222 | 1233 | 1271D | 1230 | 1268A | 04 | 12 | W | C | | 1 | 05 | 05 | 05 | 60 | 10 | 5 | C | 36 | 05 | 4 | D | R |
| D | B | 0222 | 1230 | 1268D | 1233 | 1270A | 03 | 60 | F | C | | 1 | 05 | 05 | 05 | 60 | 10 | C | 5 | 99 | 05 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | 9 | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| D | B | 0222 | 1232 | 1265D | 1230 | 1269A | 11 | 36 | F | N | 15 | 7 | 05 | 05 | 05 | 60 | 10 | 5 | 5 | 12 | 04 | 4 | D | R |
| N | A | 0225 | 1105 | 1420L | 1135 | 1370L | 01 | 12 | | N | 99 | 7 | 20 | | | 12 | | | 1 | 99 | 65 | 4 | D | C |
| N | A | 0225 | 1125 | 1388L | 1134 | 1372L | 01 | 12 | | N | 99 | 7 | 27 | | | 12 | | 1 | | 99 | 27 | 4 | D | C |
| N | A | 0225 | 1186 | 1221L | 1184 | 1220L | 01 | 12 | | CX | | 1 | 04 | | | 12 | | 2 | 2 | | 04 | 4 | D | H |
| N | A | 0225 | 1218 | 1350L | 1217 | 1358L | 01 | 12 | | CX | | 3 | 04 | | | 12 | | 7 | 7 | | 12 | 4 | D | L |
| O | A | 0225 | 1213 | 1365I | 1210 | 1368I | 01 | 12 | | CX | | 6 | 05 | | | 12 | | | | | | 4 | D | L |
| U | A | 0225 | 1215 | 1361L | 1214 | 1361I | 01 | 12 | | NX | 06 | 3 | 04 | | | 12 | | 7 | 7 | | 01 | 4 | D | L |
| D | A | 0225 | 1219 | 1343I | 1224 | 1348I | 01 | 12 | | CX | | 1 | 07 | | | 12 | | | 7 | | 07 | 4 | D | L |
| N | A | 0225 | 1225 | 1237I | 1235 | 1237I | 01 | 12 | | C | | 1 | 15 | | | 12 | | C | 2 | 99 | 15 | 4 | D | S |
| U | A | 0225 | 1230 | 1348L | 1219 | 1342I | 02 | 12 | | CX | | 1 | 12 | | | 12 | | 8 | | | 12 | 4 | | L |
| U | A | 0225 | 1230 | 1348L | 1219 | 1342I | 02 | 12 | | CX | | 1 | 12 | | | 12 | | 8 | | | 12 | 4 | | L |
| D | A | 0225 | 1230 | 1268L | 1233 | 1271L | 02 | 12 | | C | | 1 | 05 | | | 12 | | C | C | 99 | 05 | 4 | D | R |
| D | A | 0225 | 1230 | 1268L | 1233 | 1271L | 02 | 12 | | C | | 1 | 05 | | | 12 | | C | C | 99 | 05 | 4 | D | R |
| N | B | 0226 | 1214 | 1288L | 1227 | 1279 | 01 | 12 | | C | | 2 | 12 | | | 36 | 14 | | | 99 | 15 | 4 | D | O |
| E | A | 0226 | 1219 | 1343L | 1224 | 1349L | 01 | 12 | | CX | | 1 | 05 | | | 36 | | 8 | 7 | | 06 | 4 | D | L |
| G | A | 0226 | 1218 | 1348L | 1221 | 1349L | 01 | 12 | | CX | | 1 | 04 | | | 36 | | D | 7 | | 04 | 4 | D | L |
| C | B | 0226 | 1234 | 1252D | 1233 | 1260A | 01 | 12 | NW | C | | 2 | 05 | 10 | | 36 | 14 | C | | 99 | 07 | 4 | D | R |
| C | B | 0226 | 1234 | 1253D | 1233 | 1264A | 01 | 12 | NW | C | | 2 | 05 | 12 | | 36 | 14 | C | | 99 | 12 | 4 | D | R |
| D | B | 0226 | 1233 | 1271D | 1230 | 1268F | 02 | 12 | W | C | | 1 | 05 | 05 | | 36 | 14 | C | C | 99 | 05 | 4 | D | R |
| D | B | 0226 | 1233 | 1271D | 1230 | 1268F | 02 | 12 | W | C | | 1 | 05 | 05 | | 36 | 14 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0226 | 1230 | 1268B | 1233 | 1271A | 03 | 00 | F | C | | 1 | 05 | | 05 | 36 | 14 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0226 | 1230 | 1268B | 1233 | 1271A | 03 | 00 | F | C | | 1 | 05 | | 05 | 36 | 14 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0226 | 1230 | 1268B | 1233 | 1271A | 03 | 00 | F | C | | 1 | 05 | | 05 | 36 | 14 | C | C | 99 | 05 | 4 | D | R |
| G | B | 0303 | 1228 | 1249D | 1232 | 1248A | 02 | 12 | F | C | | 1 | 05 | | | 72 | 01 | 9 | C | 99 | 05 | 4 | D | R |
| G | B | 0303 | 1228 | 1249D | 1232 | 1248A | 02 | 12 | F | C | | 1 | 05 | | | 72 | 01 | 9 | C | 99 | 05 | 4 | D | R |
| G | B | 0303 | 1232 | 1248D | 1228 | 1249A | 02 | 12 | W | C | | 1 | 05 | | | 72 | 01 | C | 9 | 99 | 05 | 4 | D | R |
| G | B | 0303 | 1232 | 1248D | 1228 | 1249A | 02 | 12 | W | C | | 1 | 05 | | | 72 | 01 | C | 9 | 99 | 05 | 4 | D | R |
| G | B | 0303 | 1232 | 1248D | 1230 | 1249I | 01 | 12 | W | N | 25 | 7 | 05 | | | 72 | 01 | C | | 99 | 05 | 4 | D | R |
| C | M | 0303 | 1236 | 1258D | 1234 | 1256F | 02 | 12 | SW | P | 20 | 1 | 05 | 15 | | 72 | 03 | 5 | | 99 | 03 | 4 | D | R |
| C | M | 0303 | 1236 | 1258D | 1234 | 1256F | 02 | 12 | SW | P | 22 | 1 | 05 | 15 | | 72 | 03 | 5 | | 99 | 03 | 4 | D | R |
| C | M | 0303 | 1232 | 1248D | 1235 | 1262F | 02 | 12 | N | P | 35 | 2 | 05 | 15 | | 72 | 01 | C | | 99 | 13 | 4 | D | R |
| N | M | 0303 | 1231 | 1245I | 1229 | 1245I | 02 | 36 | W | C | | 1 | 06 | | | 72 | 05 | C | | 99 | 02 | 4 | D | R |
| N | M | 0303 | 1231 | 1245I | 1229 | 1245I | 02 | 36 | W | C | | 1 | 06 | | | 72 | 05 | C | | 99 | 02 | 4 | D | R |
| C | M | 0303 | 1232 | 1248D | 1235 | 1262F | 02 | 12 | N | P | 35 | 2 | 05 | 15 | | 72 | 01 | C | | 99 | 13 | 4 | D | R |
| D | B | 0303 | 1230 | 1269D | 1234 | 1271A | 02 | 12 | F | C | | 1 | 05 | | 10 | 72 | 07 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0303 | 1230 | 1257D | 1233 | 1256F | 02 | 00 | F | C | | 1 | 06 | | | 72 | 07 | 6 | C | 99 | 03 | 4 | D | R |
| D | B | 0303 | 1232 | 1260D | 1236 | 1256A | 04 | 12 | W | C | | 1 | 04 | | 12 | 72 | 10 | C | 5 | 99 | 06 | 4 | D | R |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | B | 0303 | 1232 | 1260D | 1236 | 1256A | 04 | 12 | W | C | | 1 | 04 | | 12 | 72 | 10 | C | 5 | 99 | 06 | 4 | D | R |
| D | B | 0303 | 1232 | 1260D | 1236 | 1256A | 04 | 12 | W | C | | 1 | 04 | | 12 | 72 | 10 | C | 5 | 99 | 06 | 4 | D | R |
| D | B | 0303 | 1232 | 1260D | 1236 | 1256A | 04 | 12 | W | C | | 1 | 04 | | 12 | 72 | 10 | C | 5 | 99 | 06 | 4 | D | R |
| D | B | 0303 | 1234 | 1271D | 1230 | 1269A | 02 | 12 | W | C | | 1 | 05 | 10 | | 72 | 07 | C | C | 99 | 05 | 4 | D | R |
| D | B | 0303 | 1234 | 1271D | 1230 | 1269A | 02 | 12 | W | C | | 1 | 05 | 10 | | 72 | 07 | C | C | 99 | 05 | 4 | D | R |
| D | B | 0303 | 1230 | 1269D | 1234 | 1271A | 02 | 12 | F | C | | 1 | 05 | | 10 | 72 | 07 | C | C | 99 | 05 | 4 | D | R |
| D | M | 0303 | 1233 | 1260B | 1236 | 1258A | 02 | 12 | F | C | | 1 | 04 | | 10 | 72 | 07 | | 5 | 99 | 03 | 4 | D | R |
| D | M | 0303 | 1233 | 1260B | 1236 | 1258A | 02 | 12 | F | C | | 1 | 04 | | 10 | 72 | 07 | | 5 | 99 | 03 | 4 | D | R |
| D | G | 0303 | 1236 | 1258D | 1233 | 1260F | 02 | 12 | W | C | | 1 | 04 | 10 | | 72 | 07 | 5 | | 99 | 03 | 4 | D | R |
| D | G | 0303 | 1236 | 1258D | 1233 | 1260F | 02 | 12 | W | C | | 1 | 04 | 10 | | 72 | 07 | 5 | | 99 | 03 | 4 | D | R |
| D | G | 0303 | 1230 | 1257D | 1233 | 1256F | 02 | 00 | F | C | | 1 | 06 | | | 72 | 07 | 6 | C | 99 | 03 | 4 | D | R |
| F | G | 0304 | 1138 | 1344D | 1143 | 1334F | 01 | 12 | SF | PX | 20 | 2 | 08 | 06 | | 12 | 12 | 1 | | | 15 | 4 | D | J |
| K | G | 0304 | 1206 | 1394B | 1198 | 1391A | 01 | 08 | W | CX | | 1 | 10 | | 10 | 10 | 08 | | 8 | | 09 | 4 | D | L |
| F | G | 0304 | 1205 | 1389B | 1199 | 1387A | 01 | 10 | W | CX | | 1 | 07 | 15 | | 10 | 10 | 8 | 6 | | 06 | 4 | D | L |
| F | G | 0304 | 1201 | 1381D | 1205 | 1386F | 01 | 10 | F | CX | | 1 | 07 | | 15 | 10 | 10 | 6 | 8 | | 07 | 4 | D | L |
| U | A | 0307 | 1085 | 1490I | | | 01 | 24 | | N | 10 | 7 | 07 | | | 24 | | 6 | | 99 | 01 | | | C |
| G | A | 0307 | 1090 | 1485I | | | 01 | 00 | S | N | 10 | 2 | 09 | | | 24 | 00 | | | 99 | 01 | 2 | | C |
| N | A | 0307 | 1141 | 1335I | 1143 | 1334I | 01 | 24 | | PX | | 1 | 08 | | | 48 | | | | | 02 | 4 | D | J |
| N | A | 0307 | 1170 | 1559L | 1175 | 1565L | 03 | 24 | | CX | | 1 | 05 | | | 24 | | 0 | | | 06 | | | N |
| N | A | 0307 | 1170 | 1559L | 1175 | 1565L | 03 | 24 | | CX | | 1 | 05 | | | 24 | | 0 | | | 06 | | | N |
| N | A | 0307 | 1170 | 1559L | 1175 | 1565L | 03 | 24 | | CX | | 1 | 05 | | | 24 | | 0 | | | .06 | | | N |
| D | A | 0307 | 1179 | 1345L | 1186 | 1343L | 01 | 24 | | N | 30 | 2 | 05 | | | 24 | | | | 99 | 07 | 3 | | P |
| C | A | 0307 | 1186 | 1342L | 1191 | 1335L | 02 | 24 | | C | | 2 | 06 | | | 24 | 00 | | | 99 | 10 | 2 | | P |
| C | A | 0307 | 1186 | 1342L | 1191 | 1335L | 02 | 24 | | C | | 2 | 06 | | | 24 | 00 | | | 99 | 10 | 2 | | P |
| N | A | 0307 | 1193 | 1569L | 1194 | 1570L | 02 | 24 | | CX | | 1 | 02 | | | 24 | | 0 | | | 02 | | | N |
| N | A | 0307 | 1193 | 1569L | 1194 | 1570L | 02 | 24 | | CX | | 1 | 02 | | | 24 | | 0 | | | 02 | | | N |
| N | A | 0307 | 1198 | 1341L | 1194 | 1332L | 02 | 24 | | C | | 1 | 08 | | | 24 | | 6 | 8 | 99 | 08 | 2 | | P |
| N | A | 0307 | 1198 | 1341L | 1194 | 1332L | 02 | 24 | | C | | 1 | 08 | | | 24 | | 6 | 8 | 99 | 08 | 2 | | P |
| U | A | 0307 | 1195 | 1216L | 1192 | 1211L | 01 | 24 | | NX | 20 | 1 | 40 | | | 24 | | 4 | 2 | | 02 | | | H |
| N | A | 0307 | 1208 | 1555L | 1210 | 1556L | 02 | 24 | | CX | | 1 | 02 | | | 24 | | 0 | | | 02 | | | N |
| N | A | 0307 | 1208 | 1555L | 1210 | 1556L | 02 | 24 | | CX | | 1 | 02 | | | 24 | | 0 | | | 02 | | | N |
| N | A | 0307 | 1216 | 1353I | 1223 | 1355I | 01 | 24 | | CX | | 1 | 07 | | | 24 | | 6 | 7 | | 07 | | | L |
| U | A | 0307 | 1226 | 1245L | 1233 | 1241I | 02 | 24 | | C | | 1 | 07 | | | 24 | | 9 | C | 99 | 10 | 4 | D | S |
| U | A | 0307 | 1221 | 1340I | 1226 | 1345I | 01 | 24 | | CX | | 1 | 12 | | | 24 | | 8 | | | 06 | | | L |
| U | A | 0307 | 1226 | 1245L | 1233 | 1241I | 02 | 24 | | C | | 1 | 07 | | | 24 | | 9 | C | 99 | 10 | 4 | D | S |
| U | A | 0307 | 1228 | 1269L | 1233 | 1271L | 01 | 24 | | C | | 1 | 05 | | | 24 | | C | | 99 | 05 | 4 | D | R |
| U | A | 0307 | 1232 | 1259L | 1235 | 1255L | 01 | 24 | | C | | 2 | 05 | | | 24 | | C | C | 99 | 07 | 4 | D | R |
| U | A | 0307 | 1231 | 1258 | 1236 | 1257 | 01 | 24 | | C | | 1 | 05 | | | 24 | | C | C | 99 | 05 | 4 | D | R |
| N | A | 0307 | 1233 | 1260 | 1230 | 1240I | 02 | 24 | | C | | 2 | 07 | | | 24 | | C | | 99 | 32 | 4 | D | R |
| N | A | 0307 | 1233 | 1260 | 1230 | 1240I | 02 | 24 | | C | | 2 | 07 | | | 24 | | C | | 99 | 32 | 4 | D | R |
| D | A | 0307 | 1230 | 1255L | 1234 | 1254L | 05 | 01 | | C | | 1 | 05 | | | 24 | | 4 | C | 99 | 05 | 4 | D | R |
| D | A | 0307 | 1230 | 1255L | 1234 | 1254L | 05 | 01 | | C | | 1 | 05 | | | 24 | | 4 | C | 99 | 05 | 4 | D | R |
| D | A | 0307 | 1230 | 1255L | 1234 | 1254L | 05 | 01 | | C | | 1 | 05 | | | 24 | | 4 | C | 99 | 05 | 4 | D | R |
| D | A | 0307 | 1230 | 1255L | 1234 | 1254L | 05 | 01 | | C | | 1 | 05 | | | 24 | | 4 | C | 99 | 05 | 4 | D | R |
| D | A | 0307 | 1230 | 1255L | 1234 | 1254L | 05 | 01 | | C | | 1 | 05 | | | 24 | | 4 | C | 99 | 05 | 4 | D | R |
| N | A | 0307 | 1302 | 1102L | 1310 | 1082L | 01 | 24 | | C | | 2 | 35 | | | 24 | | 6 | 6 | 99 | 25 | | | F |
| N | A | 0307 | 1302 | 1102L | 1310 | 1083L | 01 | 24 | | C | | 2 | 35 | | | 24 | | 4 | 6 | 99 | 40 | | | F |
| C | A | 0307 | 1305 | 1090I | 1320 | 1091I | 01 | 24 | F | C | | 2 | 30 | | | 24 | | 6 | 1 | 99 | 90 | | | F |
| N | A | 0307 | 1326 | 1087L | 1327 | 1089 | 01 | 24 | | NX | | 2 | 15 | | | 24 | | 6 | | | 02 | | | G |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | A | 0307 | 1331 | 1080I | 1336 | 1105L | 02 | 24 | | CX | | 2 | 15 | | | 24 | | 6 | 1 | | 25 | | | G |
| N | A | 0307 | 1331 | 1080I | 1336 | 1105L | 02 | 24 | | CX | | 2 | 15 | | | 24 | | 6 | 1 | | 25 | | | G |
| D | G | 0309 | 1224 | 1272B | 1233 | 1272F | 02 | 24 | SF | C | | 1 | 06 | | | 48 | 05 | 5 | C | 99 | 08 | 4 | D | R |
| D | G | 0309 | 1224 | 1272B | 1233 | 1272F | 02 | 24 | SF | C | | 1 | 06 | | | 48 | 05 | 5 | C | 99 | 08 | 4 | D | R |
| D | G | 0309 | 1234 | 1271B | 1228 | 1269F | 02 | 24 | W | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1234 | 1271B | 1228 | 1269F | 02 | 24 | W | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1234 | 1271B | 1229 | 1269F | 02 | 48 | W | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1234 | 1271B | 1229 | 1269F | 02 | 48 | W | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1234 | 1271B | 1229 | 1269F | 01 | 24 | W | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1230 | 1269B | 1234 | 1271F | 02 | 48 | F | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1230 | 1269B | 1234 | 1271F | 02 | 48 | F | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1230 | 1268B | 1234 | 1271F | 01 | 48 | F | C | | 1 | 05 | | | 48 | 05 | C | C | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1230 | 1268D | 1234 | 1271F | 01 | 00 | F | C | | 9 | 05 | 05 | | 48 | 05 | C | | 99 | 08 | 4 | D | R |
| D | G | 0309 | 1234 | 1254D | 1230 | 1255A | 05 | 00 | W | C | | 1 | 06 | | | 48 | | 5 | 4 | 99 | 06 | 4 | D | R |
| D | G | 0309 | 1233 | 1250D | 1229 | 1250A | 02 | 00 | W | C | | 1 | 05 | | | 48 | 04 | 5 | 9 | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1233 | 1250D | 1229 | 1250A | 02 | 00 | W | C | | 1 | 05 | | | 48 | 04 | 5 | 9 | 99 | 05 | 4 | D | R |
| D | G | 0309 | 1234 | 1254D | 1230 | 1255A | 05 | 00 | W | C | | 1 | 06 | | | 48 | | 5 | 4 | 99 | 06 | 4 | D | R |
| D | G | 0309 | 1234 | 1254D | 1230 | 1255A | 05 | 00 | W | C | | 1 | 06 | | | 48 | | 5 | 4 | 99 | 06 | 4 | D | R |
| D | G | 0309 | 1234 | 1254D | 1230 | 1255A | 05 | 00 | W | C | | 1 | 06 | | | 48 | | 5 | 4 | 99 | 06 | 4 | D | R |
| D | G | 0309 | 1234 | 1254D | 1230 | 1255A | 05 | 00 | W | C | | 1 | 06 | | | 48 | | 5 | 4 | 99 | 06 | 4 | D | R |
| G | G | 0309 | 1235 | 1266I | 1222 | 1277I | 05 | 24 | | C | | 1 | 05 | | | 48 | 00 | | | 99 | 10 | 3 | D | R |
| G | G | 0309 | 1235 | 1266I | 1222 | 1277I | 05 | 24 | | C | | 1 | 05 | | | 48 | 00 | | | 99 | 10 | 3 | D | R |
| G | G | 0309 | 1235 | 1266I | 1222 | 1277I | 05 | 24 | | C | | 1 | 05 | | | 48 | 00 | | | 99 | 10 | 3 | D | R |
| G | G | 0309 | 1235 | 1266I | 1222 | 1277I | 05 | 24 | | C | | 1 | 05 | | | 48 | 00 | | | 99 | 10 | 3 | D | R |
| G | G | 0309 | 1235 | 1266I | 1222 | 1277I | 05 | 24 | | C | | 1 | 05 | | | 48 | 00 | | | 99 | 10 | 3 | D | R |
| N | A | 0312 | 1127 | 1573L | 1129 | 1571I | 02 | 12 | | PX | 20 | 1 | 09 | | | 18 | | 4 | | | 02 | | | D |
| N | A | 0312 | 1127 | 1573L | 1129 | 1571I | 02 | 12 | | PX | 20 | 1 | 09 | | | 18 | | 4 | | | 02 | | | D |
| N | A | 0312 | 1172 | 1236I | 1178 | 1249L | 01 | 12 | | CX | | 1 | 08 | | | 18 | | 4 | L | | 13 | | | H |
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| U | A | 0312 | 1233 | 1261L | 1234 | 1259L | 01 | 12 | | N | 20 | 9 | 05 | | | 18 | | C | C | 99 | 04 | | | R |
| U | A | 0312 | 1233 | 1261L | 1232 | 1245L | 02 | 12 | | C | | 2 | 05 | | | 18 | | C | C | 99 | 17 | | | R |
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| D | A | 0312 | 1230 | 1256D | 1235 | 1254A | 01 | 00 | F | C | | 1 | 05 | | | 18 | | 4 | C | 99 | 05 | | | R |
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| D | A | 0312 | 1230 | 1268D | 1233 | 1271A | 03 | 00 | F | C | | 1 | 05 | | | 18 | | C | C | 99 | 05 | | | R |
| D | A | 0312 | 1232 | 1258L | 1235 | 1254L | 02 | 12 | | C | | 1 | 05 | | | 18 | | C | C | 99 | 06 | | | R |
| D | A | 0312 | 1232 | 1258L | 1235 | 1254L | 02 | 12 | | C | | 1 | 05 | | | 18 | | C | C | 99 | 06 | | | R |
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| D | A | 0312 | 1232 | 1258L | 1237 | 1256L | 04 | 12 | | C | | 1 | 05 | | | 18 | | C | C | 99 | 05 | | | R |
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| N | A | 0315 | 1178 | 1343I | 1183 | 1341I | 01 | 20 | | P | | 2 | 07 | | | 20 | | | | 99 | 06 | 2 | | P |
| N | A | 0315 | 1210 | 1550L | 1215 | 1549L | 02 | 20 | | CX | | 1 | 04 | | | 20 | | 2 | 2 | | 04 | 2 | | M |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| D | G | 0319 | 1229 | 1250A | 1233 | 1247D | 04 | 24 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | 9 | 99 | 05 | 5 | D | R |
| D | G | 0319 | 1229 | 1249I | 1232 | 1246I | 03 | 48 | SE | C | | 1 | 05 | | | 48 | 02 | 5 | 9 | 99 | 05 | 5 | D | R |
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| D | G | 0319 | 1229 | 1249I | 1232 | 1246I | 03 | 48 | SE | C | | 1 | 05 | | | 48 | 02 | 5 | 9 | 99 | 05 | 5 | D | R |
| D | G | 0319 | 1229 | 1250A | 1233 | 1247D | 04 | 24 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | 9 | 99 | 05 | 5 | D | R |
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| D | G | 0319 | 1227 | 1280D | 1220 | 1277A | 11 | 30 | SW | C | | 1 | 07 | | | 48 | 02 | C | | 99 | 07 | 5 | D | R |
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| D | G | 0319 | 1227 | 1280L | 1220 | 1277L | 04 | 48 | | C | | 1 | 07 | | | 48 | 02 | | | 99 | 07 | 5 | D | R |
| D | G | 0319 | 1227 | 1280L | 1220 | 1277L | 04 | 48 | | C | | 1 | 07 | | | 48 | 02 | | | 99 | 07 | 5 | D | R |
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| D | G | 0319 | 1220 | 1277D | 1227 | 1280A | 12 | 30 | NE | C | | 1 | 07 | | | 48 | 02 | | C | 99 | 07 | 5 | D | R |
| D | G | 0319 | 1220 | 1277D | 1227 | 1280A | 12 | 30 | NE | C | | 1 | 07 | | | 48 | 02 | | C | 99 | 07 | 5 | D | R |
| D | G | 0319 | 1220 | 1277D | 1227 | 1280A | 12 | 30 | NE | C | | 1 | 07 | | | 48 | 02 | | C | 99 | 07 | 5 | D | R |
| D | G | 0319 | 1220 | 1277D | 1227 | 1280A | 12 | 30 | NE | C | | 1 | 07 | | | 48 | 02 | | C | 99 | 07 | 5 | D | R |
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| C | G | 0319 | 1229 | 1247B | 1233 | 1244F | 02 | 36 | SE | C | | 1 | 05 | | | 48 | 02 | | | 99 | 04 | 5 | D | R |
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| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| N | G | 0319 | 1235 | 1264I | 1224 | 1275I | 02 | 24 | NW | C | 20 | 1 | 05 | | | 48 | 02 | | | 99 | 12 | 5 | D | R |
| N | G | 0319 | 1234 | 1263B | 1232 | 1240E | 02 | 36 | S | C | | 1 | 05 | 05 | 05 | 48 | 02 | | | 99 | 22 | 5 | D | R |
| N | G | 0319 | 1235 | 1264I | 1224 | 1275I | 02 | 24 | NW | C | 20 | 1 | 05 | | | 48 | 02 | | | 99 | 12 | 5 | D | R |
| D | G | 0319 | 1234 | 1271D | 1229 | 1268A | 03 | 24 | SW | C | | 1 | 06 | | | 48 | 02 | C | C | 99 | 06 | 5 | D | R |
| D | G | 0319 | 1234 | 1271D | 1229 | 1268A | 03 | 24 | SW | C | | 1 | 06 | | | 48 | 02 | C | C | 99 | 06 | 5 | D | R |
| D | G | 0319 | 1234 | 1271D | 1229 | 1268A | 03 | 24 | SW | C | | 1 | 06 | | | 48 | 02 | C | C | 99 | 06 | 5 | D | R |
| D | G | 0319 | 1230 | 1257D | 1235 | 1254A | 03 | 12 | NW | C | | 1 | 04 | | | 48 | 02 | C | 5 | 99 | 04 | 5 | D | R |
| D | G | 0319 | 1230 | 1257D | 1235 | 1254A | 03 | 12 | NW | C | | 1 | 04 | | | 48 | 02 | C | 5 | 99 | 04 | 5 | D | R |
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| D | G | 0319 | 1230 | 1256A | 1234 | 1253D | 04 | 36 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | C | 99 | 05 | 5 | D | R |
| D | G | 0319 | 1234 | 1253D | 1230 | 1254A | 02 | 48 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | C | 99 | 05 | 5 | D | R |
| D | G | 0319 | 1230 | 1256A | 1234 | 1253D | 04 | 36 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | C | 99 | 05 | 5 | D | R |
| D | G | 0319 | 1230 | 1256A | 1234 | 1253D | 04 | 36 | NW | C | | 1 | 05 | | | 48 | 02 | 5 | C | 99 | 05 | 5 | D | R |
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| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1229 | 1256D | 1229 | 1256A | 08 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 05 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 02 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 03 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 02 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 03 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 03 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 02 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 02 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 03 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 03 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 02 | 04 | 5 | D | R |
| D | G | 0322 | 1230 | 1257D | 1230 | 1257A | 02 | 00 | SE | N | 20 | 7 | 06 | | | | 00 | L | | 03 | 04 | 5 | D | R |
| G | G | 0322 | 1236 | 1257D | 1236 | 1257A | 01 | 00 | SW | N | 02 | 7 | 06 | | | | 00 | C | C | 03 | 06 | 5 | D | R |
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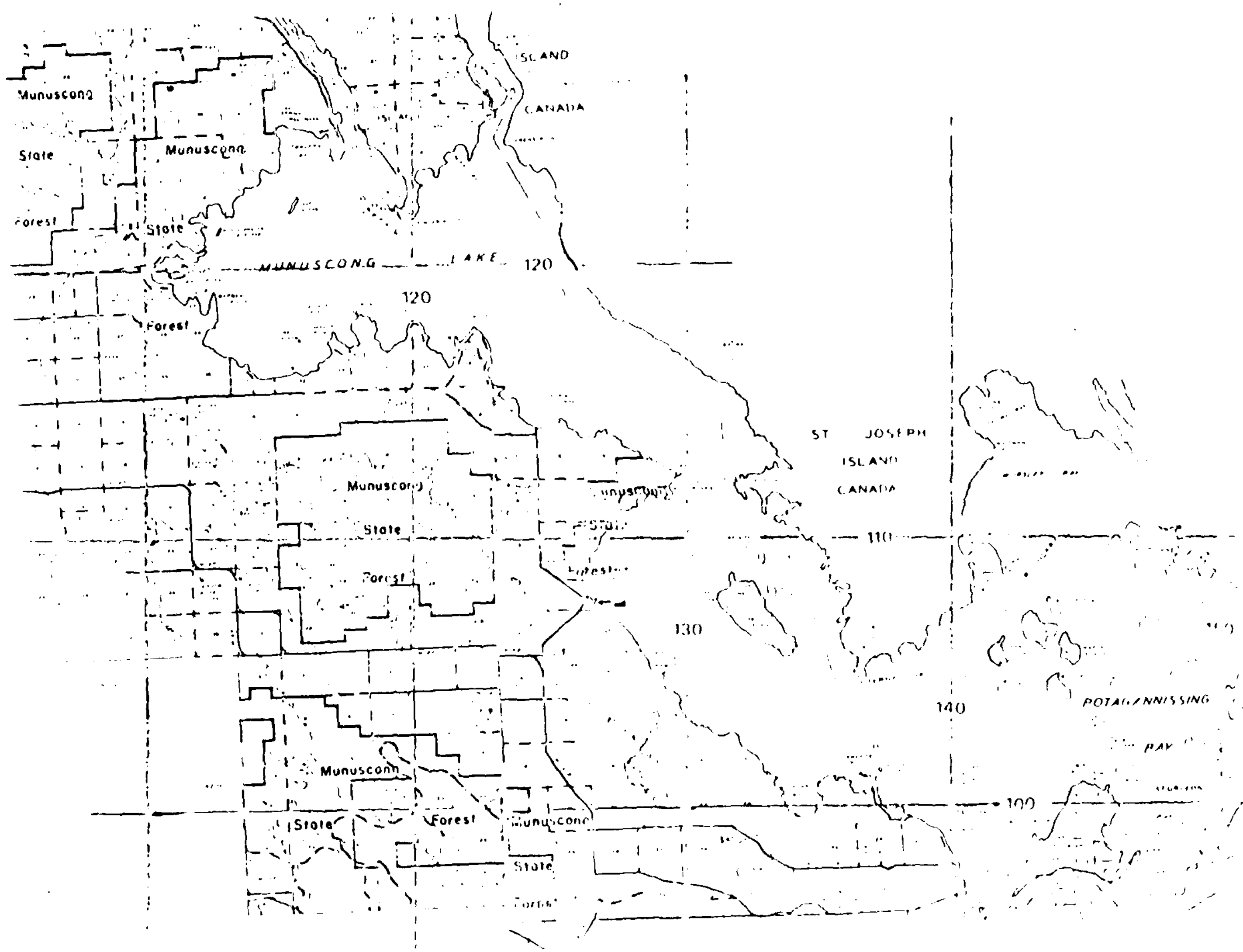
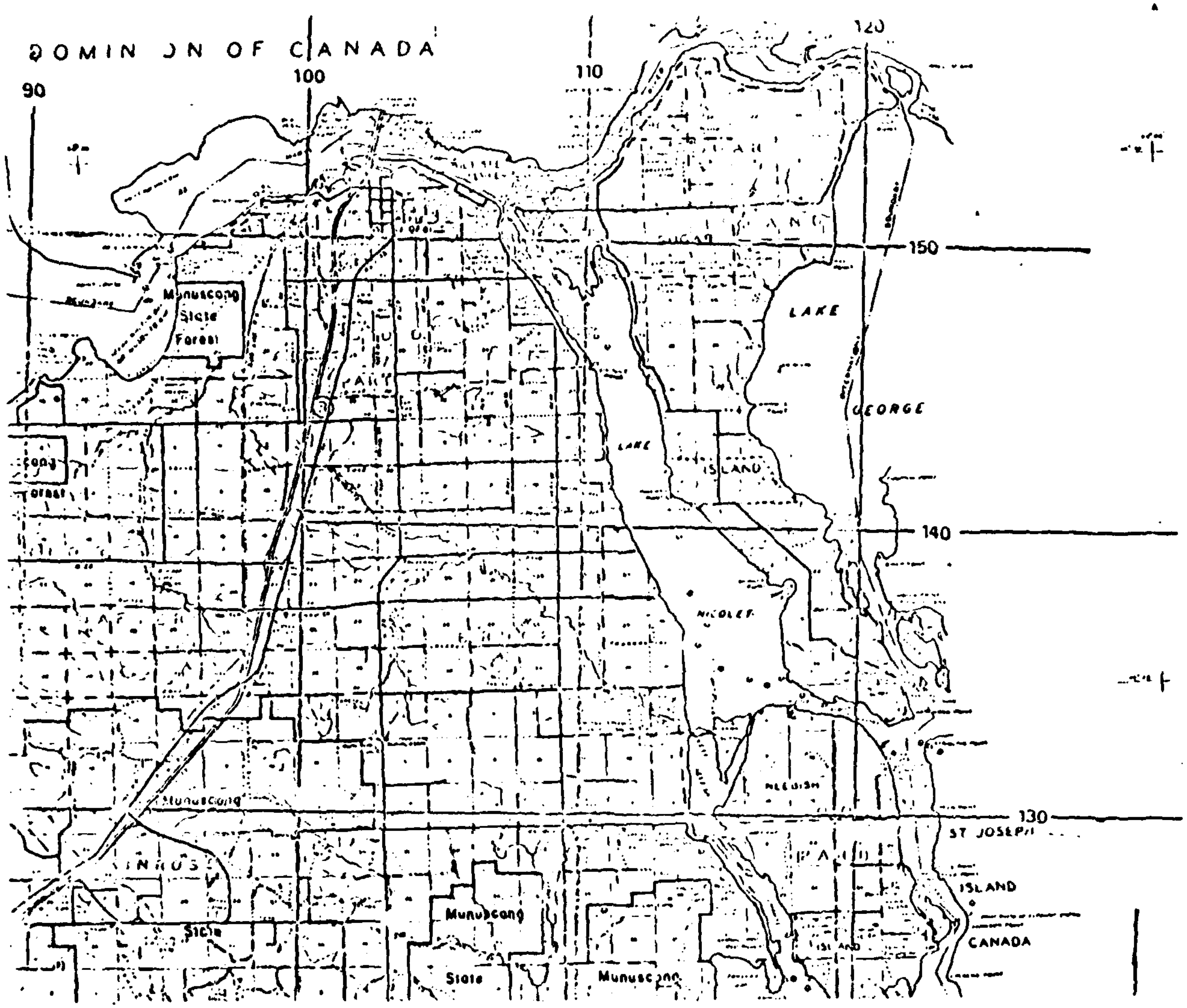
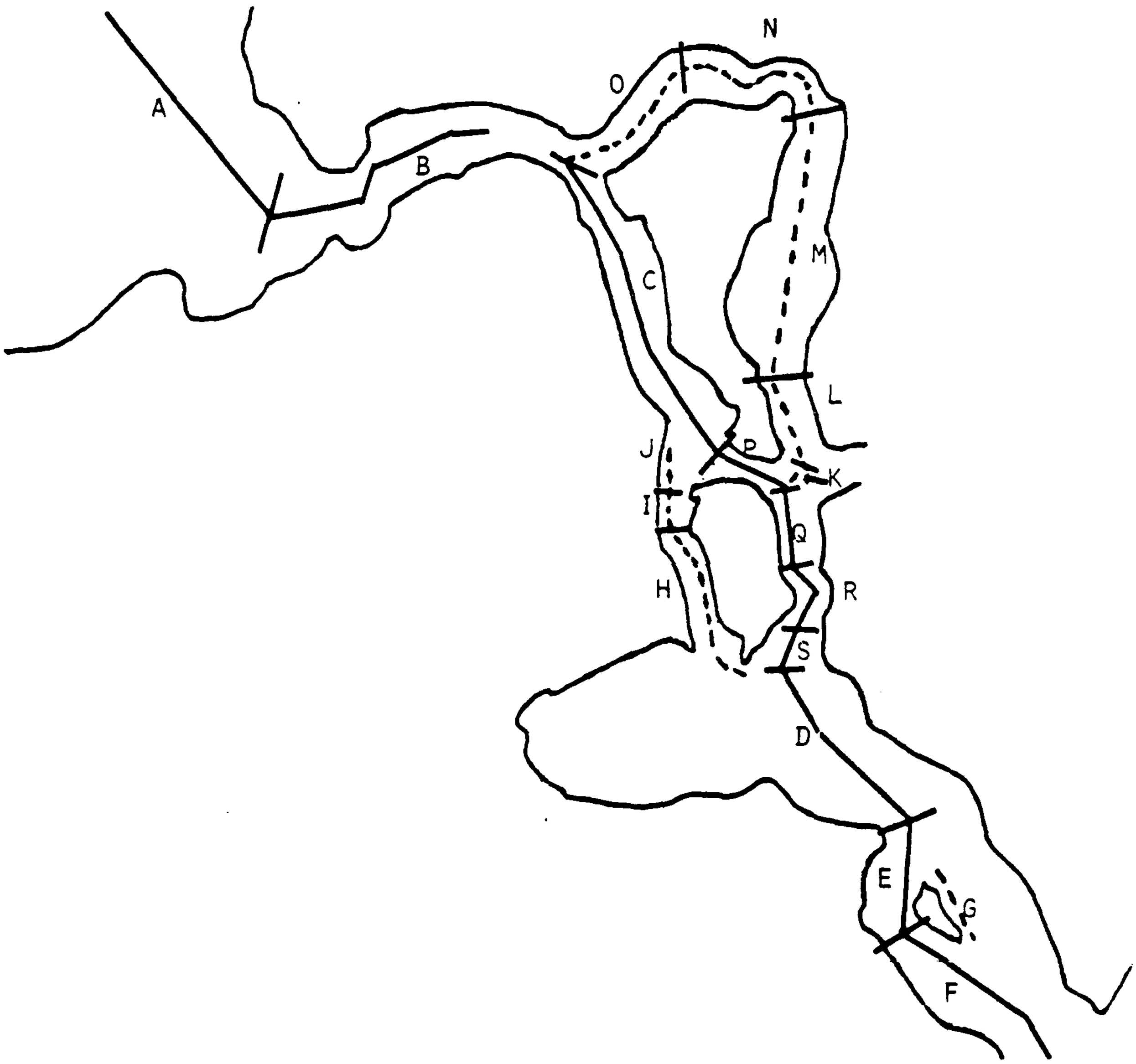



Appendix B Figure 1. Southern portion of St. Mary's River and vicinity with coordinate grid lines for identification of mammal arrival and departure locations.




Appendix B Figure 2. Northern portion of St. Mary's River and vicinity with coordinate grid lines for identification of mammal arrival and departure locations.




Appendix B, Figure 3. Map of St. Mary s River showing channel segments and lettering identification for track crossing locations.